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Test of Cage Mast Fire Control Tower

Proposal to Determine Effect on Voice Tube and Telephone Communication and Capacity of Tower to Resist Destruction Under Fire

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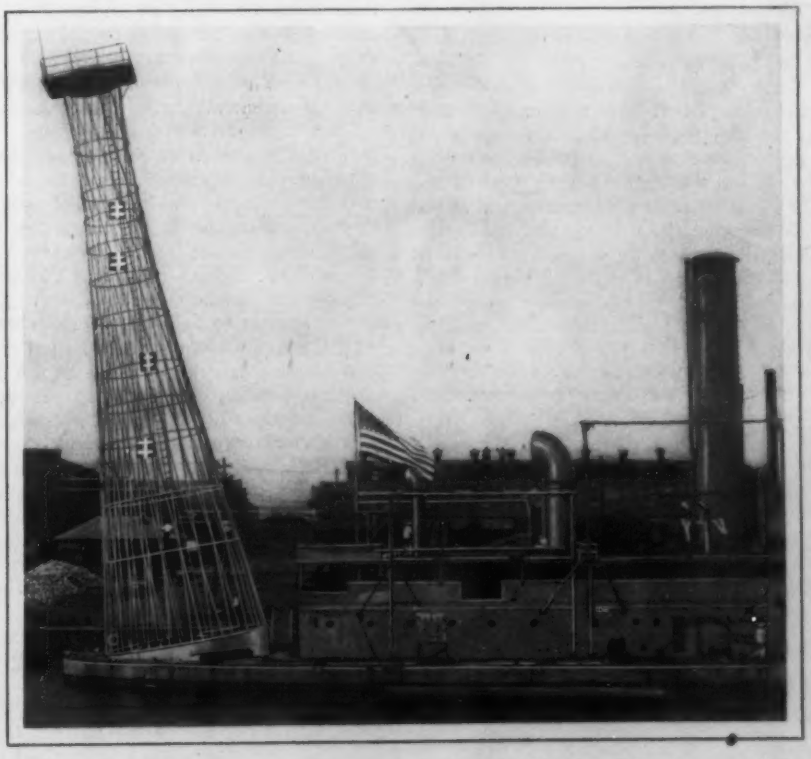
The United States Navy Department has under consideration the question of installing on the San Marcos a cage mast fire control tower of the type that has been fitted on United States battleships and armored cruisers. This is with the intention of conducting experiments by firing at it to determine the effect on the voice tube and telephone lines for communicating from the top and, also, what amount of fire these towers may be expected to stand without falling. The San Marcos has been used for gun fire experiments and offers an excellent location for this test. The arguments for the tests are about at follows:

The cage masts are of the form known geometrically as a hyperboloid of revolution. Their elements are straight and consist of seamless drawn steel tubing, latticed together by means of rings of the same material. The steel tubes are made by the cold drawing process from solid disks, and are required to show on test 60,000 lb. tensile strength and 20 per cent. elongation, and to stand without cracking, being flattened until the sides are parallel and a distance apart equal to twice the thickness of the metal. The structure combines maximum strength and stiffness with lightness and ability to stand, even though many of the elements have been ruptured by gun fire.



The cage mast fire control tower on the deck of the Monitor Tallahassee tested in 1908 by firing at it. The mast was inclined and loaded at the top to simulate possible service conditions. The squares show where the elements were cut by the shots fired at it.

The design was made in 1908 in the Bureau of Construction and Repair of the Navy Department, the necessity for something of the kind having become apparent through the generally accepted idea that one or, at most, two shots would serve to bring down the tubular steel masts previously fitted on American vessels, or the tripod masts fitted on foreign vessels. An experimental mast was built and installed at an inclination on the deck of the monitor Florida, now the Tallahassee, that was being fitted up for gunnery experiments at the time. In May, 1908, a number of shots were fired through this tower without affecting its stability. In view of later knowledge it is unfortunate that enough shots were not fired to bring down the mast, but as it was intended only to compare it with the former tubular mast no further shots were deemed necessary. The experimental mast was repaired later and installed on the battleship Idaho.

There has been considerable discussion recently over the desirability of fitting cage mast towers on the new ships. Some naval officers oppose them, chiefly on account of their exposed positions and the liability of their falling, or of having their lines of communication cut as a result of the first salvo from the enemy. In order, therefore, that the question may be understood thoroughly it is highly desirable that some such experiment as that contemplated be undertaken.

The opponents of the cage mast fire control tower advocate an armored tower, in a low position on deck, that would be practically as invulnerable to the enemy's fire as the turrets themselves, and so would assure the services of the fire control party as long as the armored tower remained intact. On the other hand the advocates of the cage mast point to the fact, as generally accepted now, that in future naval engagements the side which is able to get in the first effective salvo in all probability will win the engagement. Owing to the curvature of the earth, it is necessary in order to see the surface of the ocean at any distance that the observer be in an elevated position, the higher the greater distance and the more clearly he can see.

In view of the advantage to be gained by getting in the first salvo, hostile ships in approaching one another will open fire at as great distance as possible, perhaps as much as 15,000 yards. In order to determine the range and to correct it as it changes with the ships drawing nearer to

one another, it will be an advantage to spot the fall of these shots as promptly and as accurately as possible. It seems obvious that this can be done to better advantage from the fire control platform on top of the cage mast over 100 ft. above the surface of the water than would be possible from an armored, low position tower at about one-third the hight. Even though it may be regarded as practically certain, if the enemy displays reasonable marksmanship, that if in the course of the engagement, the towers will fall, at least they will have rendered valuable service in the early part of the fight, after which recourse may be had to the armored position.

Furthermore, the fact must not be lost sight of that a mast of some sort is necessary to support the wireless telegraph antennae and the signal yards, and, if the cage masts are done away with, tubular masts will be necessary for these purposes. These will require less damage to cause them to fall and the chance of their remaining in place, consequently, is less than for the cage mast. The cost of a cage mast does not exceed $10,000, so that the question of saving effected by their omission is not of great importance.

Rod Drilling and End Forming Machine

Among the many automatic special machines recently designed and built by the Langelier Mfg. Company, Providence, R. I., is an automatic rod drilling and end forming machine, which is illustrated herewith. The purpose of this machine is to round or chamfer both ends of round rods automatically and also to drill cotter pin holes through the rod at a point adjacent to each end simultaneously. The range of work covered by this machine is rods varying from ½ to ¼ in. in diameter and 3 to 13½ in. in length. The output of 5/16-in. rods is 3½ per minute. Fig. 1 is a view of the front or operating side of the machine, while Fig. 2 shows the rear.

The construction of the machine consists of a large oil pan mounted upon legs to which the frame of the machine is fastened. This frame consists of a horizontal bed mounted on a pair of legs that have a U cross-section, and about half way up the legs is the main cam shaft which is driven by a friction ring clutch pulley through a worm and worm gear. Upon the upper face of the bed and along its entire length there extends a dovetailed slide upon which the cross heads carrying the drilling and end forming spindles and the feed hoppers are located. The cross head at the left is stationary, and is fastened permanently to its position on the end of the bed, while that of the opposite or right side is movable along the slide and can be adjusted for different lengths of rods.

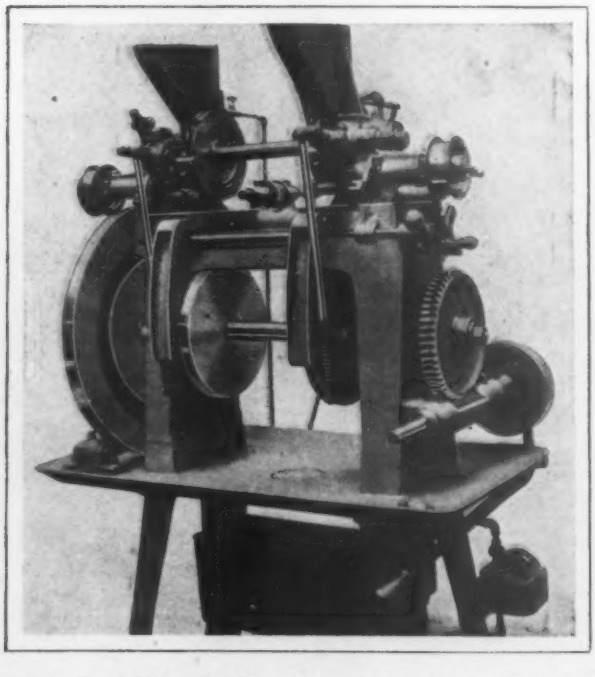


Fig. 1—Front View of a New Automatic Machine for Chamfering the Ends of Round Rods and Drilling Cotter Pin Holes Built by the Langelier Mfg. Company, Providence, R. I.

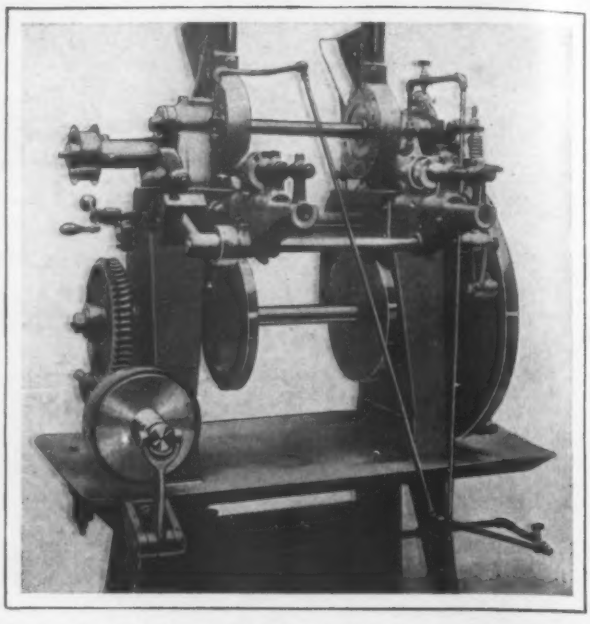


Fig. 2—A Rear View of the Machine Showing the Drilling Heads

The drilling heads illustrated in Fig. 2 are fastened one to each of the cross heads. The drilling spindle feeds are obtained from a horizontal shaft connecting both drilling heads. This shaft has segment gears meshing with racks cut into the yokes of each drilling head and obtains its movement through a cam lever from the inner face of the large cam at the left end of the machine. Two segment cams actuating the feeds to the end forming spindles are also carried by this shaft. These latter spindles are located on the front of the machine. Alligator jaws fulcrumed to the bell crank levers are actuated from the cam shaft hold the rods firmly, while they are being operated on. These spindles run in opposite directions, thus preventing and neutralizing the turning effect on the rods.

The hopper feed consists of two triangular end guides located above each of the notched disks and mounted on a shaft having bearings through each of the cross heads and deriving its motion through a pawl and ratchet wheel linked to the outer face of the large cam. The capacity of the hopper is said to be sufficient to enable the machine to run 1 hr. without refilling. The notched carrier disks in passing the opening in the hopper guides, permit the rods in the hopper to fall into the notches in the disk. In this way the rods are carried to their respective drilling and end forming positions. Each of the disks has a rectangular slot cut into its outer face to permit the ends of vises to enter and bind the rod firmly while it is being drilled. These vises are located at the lowest notch position directly under the center of the disks and are actuated by two face cams located between the legs of the frame. In addition these vises also serve as jigs for drilling the cross holes in the rods accurately. All the connections to the feed disks are flexible, so as to prevent breakage in case the rods should happen to become clogged in the hopper and not enter the notches properly.

The action of the machine is continuous and automatic and the rods, after being carried through the drilling and end forming operation, are carried up and ejected on the front of the machine. An automatic oil pump is employed to force oil to the cutting tools. The oil and the chips fall in the cavities cast in the base of the cross heads, the former being separated from the chips and guided so as to fall in the lower oil pan, where it is filtered before reentering the oil tank. The machine clutch pulley and the drilling and the end forming spindles are all driven by separate belts from an overhead counter shaft.

The floor space required by the machine measures 33x36 in., and the hight of the machine is 5 ft.

Newburgh furnace of the American Steel & Wire Company, located at the company's Newburgh steel works, Cleveland, has been dismantled. It was built in 1872, remodeled in 1886 and rebuilt in 1895-6. It was 62 x 16 ft. and was equipped with two cast iron pipe stoves.

Mill for Cold Rolling Sheet Steel

The rolling mill shown in the illustrations is designed by its builder, the Standard Machinery Company, Providence, R. I., for the cold rolling of sheet steel. Fig. 1 is a side view of the machine showing the two trains of gearing together with the three-high herringbone train, the intermediate gear and pinion being hidden. Fig. 2 is a view taken from the motor end showing the motor together with gear, pinion and balance wheel, with roll housing.

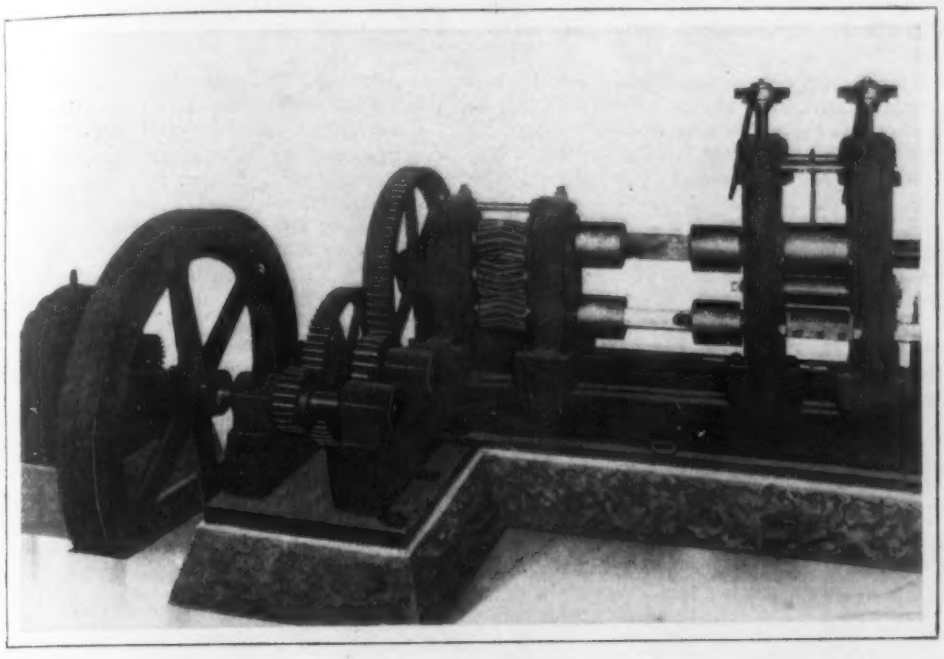


Fig. 1—View of the Rolling Mill Built by the Standard Machinery Company, Providence

Specifications of the Machine.

Weight of mill, lb	26,470
Size of motor, hp	50
Speed of motor, r.p.m	860
Weight of motor, lb	2,150
Diameter of roll, in	11
Diameter of roll, in	14
Diameter of roll, in	5
Face of roll, in	12
Gear ratio of mill complete	1 to 14.545
Gear ratio of mill exclusive of motor	1 to 11.636
Speed of rolls, r.p.m	59
Length of rail, ft	9
Weight of each rail, lb	2,270
Hight of mill from bottom of rail to top of housing, in.	63
Maximum height, ft	8
Width over both rails, in	44
Maximum width, ft	10
Length overall, ft	18

The machine is massive, the net weight including rails, balance wheel and motor being 29,000 lb. The top and bottom rolls are 11 in. in diameter with 12-in. face and the center or baby roll, 5 in. in diameter and of 12-in. face. The running out table, which is tangent to the bottom roll on each side of the housings, is fitted with bronze wedges. Each wedge has a finger clip so that it can be removed easily and so that it will guide the sheet steel without wrinkling or binding it. Extra heavy and durable adjusting screws are used and a positive drive is afforded from the herringbone train to the top and bottom rolls. The boxes of the baby roll are of cast iron with bronze lining and a bronze thrust washer is put on each end, adjusted laterally by set screws.

The wabblers are of cast steel, as are also the wabbler connections. The herringbone pinions are of cast steel and have adjustable boxes. The main driving gear attached to the central herringbone is shrouded in cast steel, as is also the shrouded pinion which meshes into it. The intermediate train of gears are of cut steel. The balance wheel is 6 ft. in diameter and has weight of 4000 lb. in the rim. The machine is direct driven by 60-hp. motor with speed of 860 r.p.m.

The mill is arranged so that the 11-in. rolls can be removed through the opening in the end and 14-in. rolls inserted therein for special work. The baby, or friction roll, is of hardened and ground mirror-lapped tool steel, and both the 11-in. and 44-in. diameter rolls are of the shell type, forced over arbors, the shell being of hardened and ground tool steel. The mill is designed to rest on a concrete foundation with the balance or driving wheel running in a pit. Bearings of all the boxes are bronze bushed both on the intermediate trains of gearing and also on the herringbone train. The motor pinion is of bronze, meshing into the motor gear of cut steel. The mill is anchored to the foundation by 2-in. bolts with foundation plates 40 in. below.

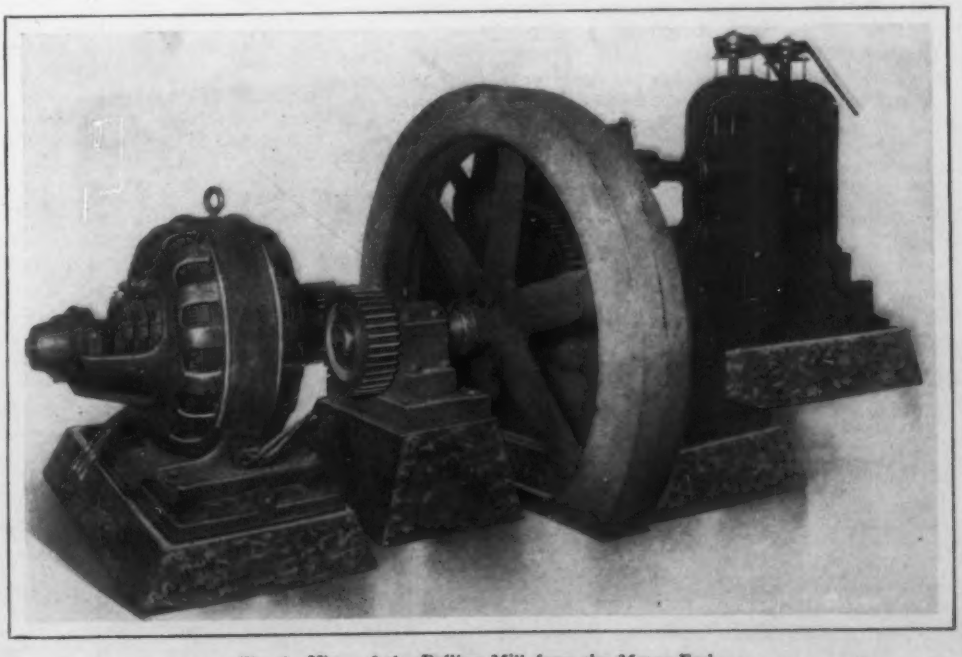


Fig. 2—View of the Rolling Mill from the Motor End

Ernest F. Burchard, of the United States Geological Survey, estimates the production of Portland cement in 1911 at 77,787,236 barrels, which is an increase of 1,300,000 barrels over the production of 1910. This represents an increase of only 1.7 per cent., as compared with the increase of 17.7 per cent. that occurred in 1910 over the previous year. The figures for 1911, as stated, are simply an estimate, and it is possible that when complete returns are received a slight decrease in production may be shown.

Coke Oven Gas in Open Hearth Furnaces

Results with Mixed Gases and with Oven Gas Alone—Higher Furnace Temperature and Economies in Construction, Repairs and Operation

In Stahl und Eisen for December 7 and 21 is an important contribution to our knowledge on the use of coke oven gas in open hearth furnaces. The writer is a well-known authority, Prof. O. Simmersbach, of Breslau. The first successful use of this gas was at Hubertushütte in Upper Silesia where Herr Amende has mixed his excess coke oven gas with gas from producers and used it in his 25-ton open hearth furnace since 1907. As much as 70 per cent. of coke oven gas has sometimes been used and this figure has not been exceeded because the coke ovens could not furnish more gas. In 1909 tests were begun at the Cockerill works in Seraing, two basic furnaces, one of 4 tons and the other of 7 tons capacity, being fired with coke oven gas alone, the gas not being preheated but led directly into the furnaces. At the end of the same year a mixture of coke oven and blast furnace gases was used in Mülheim-Ruhr in two 12-ton acid furnaces, the mixture being preheated. This was at the plant of the Deutsch-Luxemburgischen Bergwerks und Hütten-Aktien Gesellschaft. Some results obtained at this plant have already been published in *The Iron Age*.

Hydrogen Volume and Weight

At the first glance the use of coke oven gas appears difficultly possible. The high hydrogen contents, 40 to 50 per cent. and more, compared with 5 to 10 per cent. in producer gas, immediately call to mind that 1 kg. of hydrogen gives 28,557 calories, and that the highest temperatures up to the present time have been reached with the oxy-hydrogen flame. It must, however, be considered that hydrogen is very light, and that, therefore, 1 kg. takes up a large volume as is shown in the following table:

Table 1.—Gas Constants.

Unit Weight.	Cubic Contents.	Heating Value.
1 kg. H_2	11.240 cu. meters.	28,557 calories.
1 kg. CO	0.800 cu. meters.	2,429 calories.
1 kg. CH_4	1.399 cu. meters.	11,970 calories.
1 kg. C_2H_4	0.800 cu. meters.	11,145 calories.

If the heating value is calculated according to the volume, then the picture is entirely changed; as shown in the following table, hydrogen takes the last place:

Table 2.—Gas Constants.

Unit. Volume.	Weight.	Heating Value.
1 cu. meter H	0.089 kg.	2,570 calories.
1 cu. meter CO	1.251 kg.	3,034 calories.
1 cu. meter CH_4	0.715 kg.	8,562 calories.
1 cu. meter C_2H_4	1.251 kg.	13,939 calories.

It should further be taken into consideration that because of the low specific weight of hydrogen and the large volume of the unit weight of coke oven gas and also because of its high heating value, a much greater excess of air is necessary than for producer gas. This is shown in the following table:

Table 3.—Figures for Producer and Coke Oven Gas.

	Producer.	Coke Oven.
Heating value per cu. m.	1,100 cal.	4,500 cal.
Specific gravity (Air = 1)	0.9	0.4
Theoretical air for 1 cu. m.	0.95 cu. m.	4.8 cu. m.
Theoretical excess of air	20 to 30 %	45 %
Practical amount of air	1.2 to 1.3 cu. m	7 cu. m.
Heating value of 1 cu. m. gas and air mixture	520 cal.	560 cal.
Hydrogen in 1 cu. m. gas and air mixture	4.4 to 5.0	6.0 to 6.5

In Table 4 is given a comparison between coke oven and various other kinds of gas, including natural gas, in percentage by volume.

Table 4.—Comparison of Gas Analyses.

	Natural Gas.		Oil Gas.		Coke Oven Gas.		Producer Gas.
	1.	2.	1.	2.	1.	2.	Bit. Coal.
CO_2	0.60	0.29	..	0.90	1.80	2.00	6.00
O_2	0.80	0.30	0.50	..	$.20	0.20	tr.
C_nH_m	6.00	0.15	16.50	17.40	4.50	..	..
CO	0.60	0.60	..	..	8.30	4.00	20.00
CH_4	67.00	93.57	48.00	58.30	34.00	21.80	2.80
H_2	22.00	1.40	32.00	24.30	47.60	52.00	10.30
N_2	3.00	2.80	3.00	..	3.5	20.00	60.90
Heating value, cals.	7939	8802	7529	8586	5518	4200	1122

The chief reasons advanced against the use of coke oven gas are that because of its low specific gravity it will be hard to get a good mixture with other gases or with air, and that it will easily rise and flow against the furnace roof. Further, that because of its high heating value it may be dangerous for workmen and furnaces, and that the large percentage of hydrogen may have a bad influence on the steel. These opinions, however, are no longer tenable because of the successful results of tests carried out by Director Wirtz at the above mentioned plant at Mulheim-Rühr. Thanks to his courtesy, the results of the more extended tests with mixtures of coke oven and blast furnace gas, and with coke oven gas alone, are given below. The acid furnace used was of 10 tons capacity, the hearth was 13 ft. 9.3 in. x 6 ft. 4.4 in., the gas chamber 16 ft. 4 in. x 5 ft. 3 in., and the air chamber 16 ft. 4 in. x 6 ft. 10.7 in. The average analyses given below show the composition of the coke oven and blast furnace gases by volume:

	CO_2	CO.	H.	CH_4.	Heating value per cu. meter.
Coke Oven	2.8	6.1	44.6	28.6	4296 cals.
Blast Furnace	8.6	31.6	..	..	

Test No. 1—Mixed Gases

HEAT NO. I.

This test was carried out with mixed gases. An average of samples taken in front of the valve at 12:45 and 5:05 gave:

	Vol. per cent.	Weight per cent.
CO_2	5.4	11.63
CO	18.9	25.95
H_2	29.0	2.84
C_nH_4	7.6	5.96
N_2	39.1	53.62
	100.0	100.00

Each cubic meter (35.314 cu. ft.) weighs 0.918 kg. (2.02 lb.). The heating value of each cubic meter is 1981 calories without condensation and 2193 calories with condensation. The gas mixture was heated in the checker to 1085 deg. C., and an average of samples after heating taken at 1:00 and 5:10 gave:

	Vol. per cent.	Weight per cent.
CO_2	5.1	10.55
CO	20.1	27.72
H_2	27.2	2.55
CH_4	6.0	4.49
N_2	41.6	54.69
	100.0	100.00

Each cubic meter now weighs 0.957 kg.; but the heating value only amounts to 1861 calories per cubic meter without condensation, and to 2052 calories with condensation. A comparison of the analyses before and after heating show, on the average, an increase of 6.36 per cent. in the amount of carbon-monoxide over the original percentage, and a decrease of 6.21 per cent. of the hydrogen and 21.05 per cent. of the methane.

The gases were burned in the hearth with air previously heated to 1187 deg. C. Combustion was not complete, because of the small hearth measurements, and because the charge was larger than the furnace was originally designed for. Analyses of the waste gases in the checkers and chimney showed that 96 per cent. of the heat units in the original gas was developed in the furnace and chambers. Complete temperature measurements made during the course of the charge are given in the following table, and in other tables are given analyses of the metal and slag at various stages of the process. The plus (+) and minus (—) signs signify when gas was entering or leaving the checkers.

Table 5.—Temperature, Heat No. 1.

Time.	Gas Chamber.	Air Chamber.	Chimney Waste Gases.	Furnace.	Remarks.
12:00	....	1220°C	695°C	....+	
12:15	1085	1280	695	1750—	
12:30	1095	1255	705	1720+	
12:45	1090	1270	680	1775—	
1:00	1050	1210	675	1750+	
1:15	1050	1210	655	1775—	
1:30	1050	1200	640	....	

	Gas Chamber.	Air Chamber.	Chimney Waste Gases.	Furnace.	Remarks.
3:45	1060	1230	655	1700+	Scrap and Spiegel added.
2:50	1045	1210	635	1830—	
2:55	1030	1170	625	1790—	
2:30	1035	1170	610	1780+	
2:45	1070	1180	605	1820+	Spiegel added.
3:00	1080	1195	595	1780—	
3:10	1085	1190	600	1820—	
3:20	1090	1185	600	1700+	
	Stoppage, 3:25. No coke oven gas.				
3:40	....	....	...	1680	
3:50	1090	1190	500	1655	Only Blast Furnace Gas
4:00	1100	1190	500	1670	
4:10	1105	1185	495	1630	
4:20	1125	1205	480	1850—	Coke Oven Gas again.
4:30	1110	1190	535	1820+	
4:40	1095	1175	535	1780—	Ferromanganese and Ferro-silicon added.
4:50	1100	1180	555	1860—	
5:00	1115	1190	530	1780+	Ferrosilicon added.

Table 6.—Steel Analyses, Heat No. 1.

Test No.	Time Taken.	C.	S.	P.	Mn.	Si.
1	2:40	.204	.071	.103	.17	tr.
2	3:00	.173	.058	.106	.19	tr.
3	3:15	.162	.064	.105	.17	tr.
4	3:30	.173	.085	.113	.18	tr.
5	3:55	.144	.069	.109	.18	tr.
6	4:35	.125	.081	.113	.18	tr.
7	4:55	.144	.081	.100	.17.	tr.
8	5:00	.173	.066	.126	1.26	.14

Table 7.—Slag Analyses, Heat No. 1.

No.	Time Taken.	Fe.	Mn.	SiO_2.	Al_2O_3.	CaO.	MgO.	S.
1	4.25	15.98	14.07	57.32	3.26	.86	..	.12
2	4.55	11.86	18.56	52.44	6.77	.41	..	.066

HEAT NO. 2.

Similar details are then given of another heat which was made with mixed gas. The composition of the gas in front of the valve was:

	Vol. per cent.	Weight per cent.
CO_2	6.0	27.36
CO	19.4	20.90
H_2	25.8	2.38
CH_4	7.3	5.45
N_2	40.0	52.50

Each cubic meter weighed 0.962 kg., and the heating value per cubic meter was 1932 calories without condensation, and 2126 calories with condensation. The mixture was heated to 1137 deg. C., and after the heating gave the following analysis:

	Vol. per cent.	Weight per cent.
CO_2	5.6	11.34
CO	21.5	27.76
H_2	24.8	2.26
CH_4	6.3	4.64
N_2	41.8	54.00

Each cubic meter now weighed 0.977 kg. and the heating value was 1840 calories without and 2020 calories with condensation. A comparison of the analyses shows that the carbonic oxide increased 2.87 per cent. and the hydrogen and methane decreased 3.88 per cent. and 13.7 per cent. respectively. The air was preheated to 1202 deg. C. In this case also combustion was not complete in the furnace, analyses of the waste gases showing that 92.6 per cent. of the heat units was developed in the furnace and checkers. Tables of temperatures and analyses are again given in the original paper, but need not be reproduced. The time of the charge was from 11:20 to 3:40. The final analysis was:

	Per cent.
C	.234
S	.076
P	.088
Mn	1.10
Si	.24

Test No. 2. Coke Oven Gas

HEAT NO. 3.

The average analysis of the gas used for No. 3 heat, the samples being taken at 1:25 and 2:55, was as follows:

	Vol. per cent.	Weight per cent.
Co_2	2.7	8.09
CO	9.4	17.91
H_2	42.0	5.71
CH_4	23.5	25.60
N_2	22.4	42.69

Each cubic meter weighed 0.661 kg. The heat value without condensation is 3390 calories, and with condensation 3824 calories. The gas was preheated in the checker to 983 deg. C., and the average of samples taken after heating, at 1:35 and 3:00, was as follows:

	Vol. per cent.	Weight per cent.
Co_2	3.2	8.38
CO	9.2	15.38
H_2	37.9	4.52
CH_4	19.5	18.62
N_2	30.2	53.10

One cubic meter weighed now 0.754 kg., and the heating value is only 86.6 per cent. of what it was before heating, namely, 2936 calories without condensation and 3387 calories with condensation. The analyses show a decrease by volume of 2.13 per cent. in the amount of carbonic oxide, 9.77 per cent. in that of the hydrogen, and 17 per cent. in that of the methane. The air was preheated to 1000 deg. C., and again the waste gases showed evidence of incomplete combustion, 97.4 per cent. of the heat units being utilized. The temperature record is shown in Table 8, and analyses of the metal and slag in Tables 9 and 10. The quality of the finished steel was satisfactory.

Table 8.—Temperatures, Heat No. 3.

Time.	Gas Chamber.	Air Chamber.	Chimney Waste Gases.	Furnace.	Remarks.
12:10	875°C	1120°C	....	1600°C	
12:25	865	1085	....	1620	
12:35	720	1090	....	1700	
12:45	705	1065	....	1630	
1:00	730	1090	515	1725	
1:15	770	1070	525	1700	
1:30	870	1040	535	1540	Scrap added.
1:40	980	1020	545	....	
1:45	1000	1000	555	1600	
2:00	990	980	540	1800	
2:15	990	965	525	1725	
2:20	980	950	525	1770	
2:30	980	950	510	1770	
2:40	965	980	455	1770	
2:50	980	980	485	1770	
3:00	970	980	480	1760	
3:10	1000	980	530	1825	Ferromanganese and Ferro-silicon added
3:20	980	1005	500	1790	
3:30	980	1010	505	1760	

Table 9.—Analyses, Heat No. 3.

Test No.	Time Taken.	C.	S.	P.	Mn.	Si.
1	2:10	.185	.059	.085	.08	tr.
2	2:15	.139	.063	.085	.07	tr.
3	2:25	.150	.069	.084	.07	tr.
4	2.35	.169	.058	.085	.09	tr.
5	2:45	.150	.068	.083	.09	tr.
6	2:55	.130	.064	.085	.09	tr.
7	3:25	.169	.064	.094	.90	0.26

Table 10.—Slag Analyses, Heat No. 3.

No.	Time Taken.	Fe.	Mn.	SiO_2.	Al_2O_3.	CaO.	MgO.	S.
1	2:45	19.60	11.81	53.32	0.75	1.38	..	0.11
2	3:25	13.54	17.65	54.60	2.29	1.73	..	0.08

HEAT NO. 4.

Details are next given of the fourth experimental heat, which was also made with coke oven gas alone. Average analyses before and after preheating are given below. The gas was preheated to 1016 deg. C.

	Before		After	
	Volume. per cent.	Weight. per cent.	Volume. per cent.	Weight. per cent.
CO_2	2.9	9.72	3.1	9.68
CO	7.9	16.83	8.7	17.29
H_2	45.0	6.85	43.5	6.18
CH_4	30.4	37.10	25.8	29.33
N_2	13.8	29.50	18.9	37.52

The heat value per cubic meter after heating is only 90.8 per cent. of what it was before heating, the figures being 3636 calories without condensation and 4141 calories with condensation. Through the heating the gas has suffered a decrease of 3.34 per cent. in the amount of hydrogen, 15.13 per cent. in that of methane, and an increase of 10.1 per cent. in the amount of carbonic oxide. The combustion, which was brought about with air at 1169 deg. C., was in this case also incomplete. Analyses of the waste gases show that 92.2 per cent. of the heat units was used. The quality of the steel was good. Details of the charge are given in the following tables, including the very interesting temperature measurements. The quality of the finished steel was good. Again the plus and minus signs indicate respectively the gas entering and leaving the checkers:

Table 11.—Temperatures, Heat No. 4.

Time.	Gas Chamber.	Air Chamber.	Chimney Waste Gases.	Furnace.	Remarks.
11:30	1005°C	1200°C	585°C		
12:00	1005	1135	585	1850+	
12:15	1000	1140	595	1660+	
12:30	1005	1150	585	1660+	
12:45	1020	1125	575	1700+	
1:15	1010	1080	565	1620—	Scrap added.
1:30	975	1125	545	1600—	
1:45	985	1130	545	1830—	Scrap added.
2:00	1000	1110	560	1750+	
2:15	975	1120	545	1850—	
2:30	980	1180	545	1680+	
2:40	1020	1155	585	1680+	Ore.
2:50	1025	1135	590	1650+	Ore.
3:00	995	1165	585	1720—	

Time.	Gas Chamber.	Air Chamber.	Chimney Waste Gases.	Furnace.	Remarks.
3:10	1005	1190	600	1660+	Ore.
3:20	1040	1160	615	1720—	
3:30	1015	1225	615	1680—	
3:40	1020	1235	600	1680—	
3:50	1050	1190	605	1700+	
4:00	1050	1175	615	1750—	Ferromanganese and Ferro-silicon added
4:10	1020	1170	605	....+	
4:15	1030	1160	595	1770	
4:25	1020	1170	615	1800	

Table 12.—Analyses.

Test No.	Time Taken.	C.	S.	P.	Mn.	Si.
1	3:05	.243	.066	.130	.15	tr.
2	3:20	.243	.072	.120	.14	tr.
3	3:40	.273	.077	.119	.13	tr.
4	3:50	.214	.074	.130	.12	tr.
5	3:57	.195	.069	.126	.12	tr.
6	4:15	.243	.064	.130	1.16	.12

Table 13.—Slag Analyses.

No.	Time Taken.	Fe.	Mn.	SiO_2.	Al_2O_3.	CaO.	MgO.	S.
1	3:50	16.77	12.76	55.96	4.19	.86	..	.17
2	4.15	14.19	13.95	57.76	3.13	.101	..	.07

HEAT NO. 5.

This also was made with the use of coke oven gas alone. It was preheated to 906 deg. C., and after heating the number of calories per cubic metre were 3512 without and 3970 calories with condensation. This value is 91.2 per cent. of that of the original gas. The heating brought about an increase of 14 per cent. in the amount of carbon-monoxide, a decrease of 3.83 per cent. in that of the hydrogen and 12.93 per cent. in that of the methane. The air was preheated to 1113 deg. C. Combustion was not complete in the furnace, only 75.8 per cent. of the heat units being profitably utilized. The final steel had the following analysis and was good:

C	.253
S	.069
P	.106
Mn	.79
Si	.15

The temperature in the furnace varied from 1600 deg. C. to 1800 deg. C., and tables similar to those already given for the preceding heats are given in the original paper. Details are also given of Heat No. 6 made with coke oven gas alone, but they are very similar to those of heats Nos. 3, 4 and 5.

General Conclusions

If the results are brought together it is seen that one cubic meter of the mixed gases weighed 0.940 kg. The difference in specific weight compared with air is not very considerable, so that mixing of gas and air offers no special difficulty. The heating value of the gases on the average was 2256 calories per cubic meter. For the coke oven gas alone 1 cubic meter on the average weighed 0.603 kg. The specific weight is about 50 per cent. different from that of the mixed gases, and the heating value on the average amounted to 4261 calories per cubic foot.

Finished tests from each of the six heats were examined microscopically and no difference could be seen between those made with mixed gas and those with coke oven gas alone. The structures are good and the condition in regard to the inclusion of foreign bodies is also good.

GREATER HEAT THAN WITH PRODUCER GAS.

The temperature records show that the heat produced in the hearth both with the use of mixed gases and with coke oven gas alone is much greater than that ordinarily produced by producer gas. According to Dichmann the highest attainable temperatures found in the latter case are from 1780 to 1788 deg. C., but temperatures of 1850 deg. C. and higher were easily reached with coke oven gas. This will ensure a more thorough mixture of the bath because with the higher temperature the carbon makes increasing effort to unite with oxygen. At the same time the bath can be worked more quickly, because the exchange of heat between flame and bath is more effective. With the use of coke oven gas one is in the position to easily increase the temperature towards the end of the heat, and so to make the working of the furnace easier and more comfortable. For these reasons the output of the furnace is considerably increased. At Seraing it was raised from 3 or 4 to 5 heats, and the same results were obtained at Mülheim-Ruhr. Without question an increased output of 15 to 20 per cent. can be reckoned upon, using the scrap process; and small scrap, such as turnings, can be profitably used. Further, through this shortening in the time of operation the loss of heat by radiation will be cut down. It should also be borne in mind that the product is in a very thin and liquid condition, and longer time can be taken for casting, which will improve the quality of the steel.

The value of the coke oven gas with producer gas should not, therefore, be made on the basis of heat units per cubic meter alone, but the increased output and lower radiation losses should also be taken into consideration.

MORE ECONOMIES YET TO BE REALIZED.

It must be remembered that the first tests as to the saving with the use of coke oven gas have not been carried out in specially built furnaces, but in those already present and arranged for producer gas. Further, the workmen were not experienced, and because no gasometer was used the gas was not uniform. Under such conditions it is evident that troubles would arise, and that the advantage following the use of coke oven gas would not immediately be seen in the right light. The author agrees with Diehmann that the last word in regard to fuel economy in open-hearth practice has not yet been said. When using the valuable coke oven gas the workmen will learn to be as saving as possible, to carefully regulate the air supply, and how to use the higher hearth temperatures in the best and most suitable ways, so that the time of charge may be considerably shortened and the output increased.

With preheating of either coke oven gas or mixed coke oven and blast-furnace gases, a decomposition takes place. As the analyses already given have shown, the carbonic oxide is increased in amount and the hydrogen and methane decreased. The specific gravity is also changed, with mixed gases about 3 per cent. and with coke oven gas about 10 per cent.

In both cases the heating value is considerably lowered, as has already been pointed out. Because of this the theoretical temperatures reached with preheated gas and air are not much higher than those reached with original cold gas and hot air. This is brought out plainly by a table given in the original paper, which shows, with air heated to 900 deg. C., the theoretical temperatures of 2070 deg. C. for producer gas and about 1960 deg. C. for blast furnace gas. The composition of the gases was as follows:

	Blast Furnace Gas.	Producer Gas.
H_2	3.00 per cent. vol.	12.30 per cent. vol.
CO	24.00	19.80
O_2	0.60	7.50
CO_2	13.00	1.30
N_2	59.00	59.60
Heat units	828 and 813	1094 and 1024

If 85 per cent. of the calculated temperature is reached at the end of the charge, it is very good, so that the figures above give 1760 deg. C. for producer gas and 1660 deg. C. for blast furnace gas. As 1700 deg. C. is the minimum temperature required in the open hearth furnace, the temperature given by blast furnace gas alone is too low.

As coke oven gas also is destroyed by heating, it is more suitable to lead it directly into the furnace and only preheat the air. This brings about the further advantage that the gas can be led through pipes directly into the furnace, and the furnace head made considerably more durable. Long furnaces are the most suitable for coke oven gas, as they favor complete combustion. The life of a furnace with coke oven gas firing is, to-day, exactly as long as with producer gas. In the earlier campaigns this was not the case, but as soon as the workmen became used to the new fuel, destruction of the roof was avoided. If cold gas is used, this will tend to stop, because it is heavier than air heated to 1000 deg. C. and more, so that the danger of the mixture rising against the roof is not so great.

In Seraing, for instance, the furnaces stand 300 heats with producer gas, and formerly gave only 230 with coke oven gas, but now they stand over 300. In other places more than 600 heats in one campaign have been reached. Based on these results the Cockerill people in Seraing have built two 40-ton furnaces to use cold coke oven gas, and Director Wirtz, in Mülheim, will soon put two furnaces in operation with the same cold fuel.

NEEDED ALTERATIONS OF FURNACES

It is self-evident that the furnaces arranged for producer gas cannot be used directly for coke oven gas heat-

ing. The gas and air ports must be altered in size. It is also a good thing to incline the air port at a greater angle and so increase the velocity of the gases in the outgoing port, in order to work against the tendency of the gases to rise to the roof. Further, the ports should be placed low so that the flame can touch the bath along its whole length. Various other suggestions are made, and it is stated that if mixed coke oven and blast furnace gases are used the heating value is only slightly above that of producer gas, and the workmen have very little to learn. The proper mixing is most easily done in some type of gasometer, and the author describes in detail the Hohmann gasometer.

Advantages Summarized

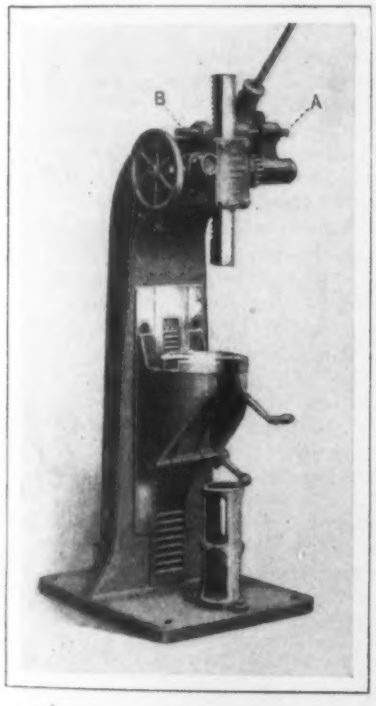
After some further considerations the author sums up his article by saying that if the advantages following the use of coke oven gas are brought together they lead to the following:

1. Higher furnace temperatures, greater output.
2. More uniform combustion, greater saving in fuel.
3. Elimination of the gas chambers, cheaper furnace construction.
4. Better construction of the furnace head, smaller repair costs.
5. Cheaper operating costs.

G. B. W.

Mandrel Press with Variable Lever Manipulation

Combining the advantages of the simple lever with those of the compound one with the result that the force applied at the end of the handle is greatly increased is the special feature of a mandrel press which is built in three sizes by the G. T. Eames Company, Kalamazoo, Mich. The press is designed for pushing in bushings, broaching, bending or straightening, punching and for many other purposes in general machine shop work.



A New Type of Mandrel Press Built by the G. T. Eames Company, Kalamazoo, Mich.

The change from the simple to the compound leverage is secured by the manipulation of the pins A and B, shown in the accompanying engraving. By pressing the pin A the simple leverage is employed which gives the ram a movement of 2½ in. By pressing the other pin, B, the leverage is increased five times while the ram travel is reduced in the same proportion, or to ½ in. The variation in the leverage enables a mandrel to be inserted quickly and as tightly as it should be driven. The ram of the press is square and is operated by a rack and pinion movement, and the ram can be instantly clamped in any position while the work is being adjusted, a lock nut being provided in the head for this purpose.

In the two largest sizes the tables are adjusted by a rack, one revolution of the pinion handle being sufficient to raise the table from the lower to the upper limit of its travel and vice versa. In this way it is said to be possible to vary the position of the table much more quickly than was the case with the screw motion, and a simple lock quickly clamps the table in position.

The Blandon Rolling Mill, Blandon, Pa., which has been idle for some time, resumed partial operations February 5, when the puddling and 8-in. mills were started.

The World's Shipbuilding in 1911

The total mercantile tonnage built in British yards in 1911 amounted, according to Lloyd's Register, to 1,803,844 tons, against 1,143,169 tons in 1910 and 991,066 tons in 1909, so that in two years there has been an increase of 812,778 tons. The year, indeed, was very nearly a record, and only once before have these figures been exceeded, the history of the last six years working out as follows:

	Tons.		Tons.
1906	1,828,343	1909	991,066
1907	1,607,890	1910	1,143,169
1908	929,669	1911	1,803,844

Over the same period of six years the world's output and the division between the United Kingdom and the rest of the world are as follows:

	The World. Tons.	United Kingdom. Tons.	Other Countries. Tons.
1906	2,919,763	1,828,343	1,091,420
1907	2,778,088	1,607,890	1,170,198
1908	1,833,286	929,669	903,617
1909	1,602,057	991,066	610,991
1910	1,957,853	1,143,169	814,684
1911	2,650,140	1,803,844	846,296

The outstanding fact in this table is the wonderful predominance of British shipbuilding. Of the total mercantile output of the world no less than 68 per cent. comes from British yards.

Commenting on these figures the London Economist says: "Among the foreign producers Germany holds her own, and her output of 1911 comes third in the history of her shipbuilding—beaten by 1906 and 1907—while the United States is still on the down-grade, the output for 1911 being the lowest recorded since 1897. After Germany and the United States come France, Holland, Japan and Austria-Hungary, in the order named. If the year 1911 was a prosperous time for the shipbuilder it was also a good period for the shipowner, and in the course of the 12 months a striking recovery took place in freights and in the general outlook for the shipping business. The result of the movement is seen in the shipbuilding returns, for owners do not give orders for new ships unless they see their way to fill them with cargo and run them at a profit."

Gunboat Bids Too High

The Government came in conflict with labor conditions again February 1, when bids for the gunboat authorized by Congress as a part of this year's programme were opened by the Navy Department. The boat is to be named the Sacramento if she is ever built. The appropriation for building her is $500,000, and the Secretary of the Navy desired to have her completed in 12 months.

The New York Shipbuilding Company refused to bid at all and said that such a ship would cost at least $735,000. The Cramps put in a bid for $716,500, but offered for $485,000 to build a gunboat considerably smaller. The reason advanced by both companies for their inability to bid within the appropriation was that the cost of living and the upward trend of wages, with the limitation of the eight-hour law for work on Government ships, made it impossible to meet the figures set by Congress. The department is now considering the feasibility of building the Sacramento in a Government yard.

The Equitable Life Assurance Company has purchased a 500-gal. Underwriter fire pump with all the accessories and appurtenances for automatic control in accordance with the Factory Mutual Insurance Companies' specifications from Henry R. Worthington, 115 Broadway, New York City. This is to be installed in the company's Hazen Building on Greenwich street, between Carlisle and Albany streets. This building, which is located about six blocks from the recently destroyed building on Broadway, is used for the storage of the company's records and houses about 1000 employees.

In the Pittsburgh district 44 furnaces were in blast February 1, a gain of 6 in January. The furnaces now idle are 1 Monongahela, 1 Edgar Thompson, Edith, Neville Island, 2 Isabella and 3 Aliquippa.

The Garvin Monitor Lathe

A Pneumatically-Operated Chuck and a New Type of Turret Indexing Mechanism Special Features

The No. 22 monitor lathe as regularly built by the Garvin Machine Company, Spring and Varick streets, New York City, possesses a number of interesting features. Among these are automatic power feed to the turret slide, adjustment for the cross slide, an automatic chucking equipment and a special equipment for indexing the turret. The special advantages claimed for the chucking equipment are a great saving in the time of chucking and removing parts as compared with the ordinary type of wrench chuck and the consequent reduction to a minimum of the non-productive time consumed in operating the machine. Fig. 1 is a view of the machine, while Fig. 2 illustrates the turret indexing mechanism.

Referring to Fig. 1, it will be noticed that the cylinder is at the rear end of the spindle, and when pressure is admitted to this cylinder the piston is forced to move. Directly connected with the piston is a rod which reaches to the multiple wedge plug, which operates on corresponding grooves located in all three of the sliding chuck jaws. This chuck is what is known as the 6-in. three-jaw adjustable blank type and the grip is controlled entirely by the air pressure employed. It is pointed out that the grip is non-yielding and has a tendency to tighten rather than loosen. In handling delicate pieces it is possible to reduce the grip by employing a pressure reducing valve on the pipe line between the source of supply and the operating valve. For use in factories which are not equipped with air under pressure the manufacturer is prepared to furnish a spring operating mechanism, the relation between the two types being practically the same as those between the air and spring-operated chucks which were illustrated in *The Iron Age*, March 9, 1911.

The pressure employed for closing the jaws on the work automatically releases the brake and starts the spindle rotating while the removal of the pressure, either of the spring or the compressed air, stops the spindle and opens the chuck jaws to their full limit. If desired two-jaw chucks of different sizes and styles can be substituted for the three-jaw chuck regularly furnished.

As will be noticed from Fig. 2, the turret is of hexagon shape, having six flat surfaces with four flat screw holes for securing rigidly either tools or fixtures to these faces. A recent addition to the constructional details of the builder's turret is the solid steel turret rotator A, which is hardened and ground, and combines in one piece the indexing star wheel B, the spiral gear C that turns the individual stop wheel shaft D, forms the shank and holding down flange for the turret and extending upward takes the binder handle and serves as the binder bolt. In this construction a number of separate pieces have been eliminated, with the result, it is pointed out, that there is nothing to work loose under the continual pounding of the indexing of the turret, and the acting parts are not only in one piece without joints, but they have also been made in a much stronger form than was possible when they were separate. The teeth of the index star wheel B are shrouded by the flange above and the spiral gear C forms a holding flange that is solid with the shank of the turret. Two large Woodruff keys E, which form a mortise joint with the turret, lock the rotator fast to the turret and eliminate any possibility of loosening. In this way it is pointed out that the advantage in point of durability of a hardened and ground shank for the turret to turn on is secured. A large take-up nut, F, holds the turret down to a working fit without interfering with the top binder action. One turret hole passes through the rotator so that it is possible to pass work entirely through the turret for one position. These turrets are hexagonal in form, with top binders for the tool shank and locating tongue groove and four jigged holes in each face for attaching tools.

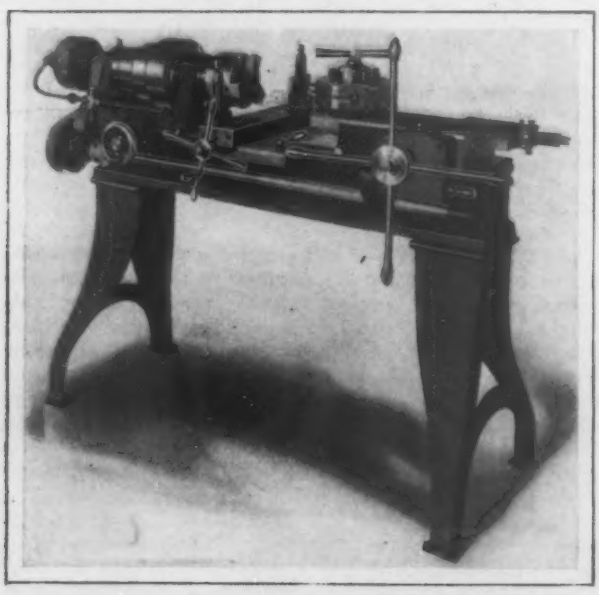


Fig. 1—The No. 22 Monitor Lathe with Pneumatically-Operated Chuck Built by the Garvin Machine Company, New York City.

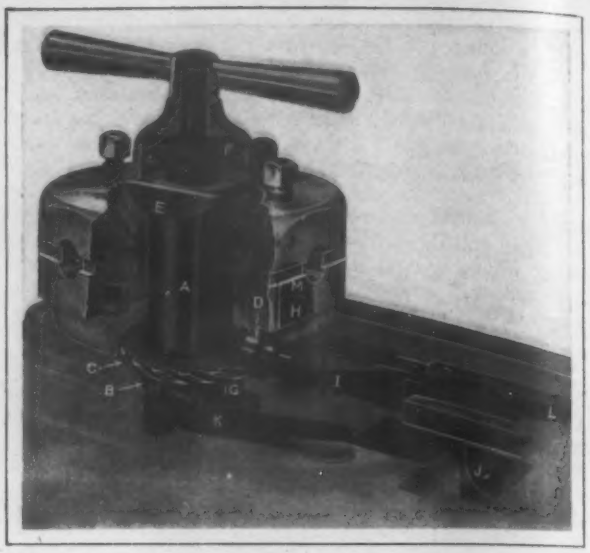


Fig. 2—Details of the Turret Indexing Mechanism Employed on the Lathe

The operation of this mechanism is briefly this: The stop G brings the turret to rest before the index pin H seats itself. On the return movement of the turret slide the end of the lock pin lever I rides up and slides along the tumbler J, withdrawing the lockpin H from its seat and holding it out. The turret rotator lever K now engages the star wheel portion B of the turret rotator A and rotates the turret. The combined backward movement of the turret slide and the partial rotation of the turret bring the back of the wheel of the rotator against the solid stop G in the turret base. The momentum of the turret is absorbed in striking the stop pin and the turret and the turret slide come to rest. As the rotator is being indexed around, the spiral gear C turns the pinion D which rotates the shaft carrying the individual stops, thus bringing a new stop in position for each turret face. On the forward motion of the turret slide the tumbler K operates, releasing the lock pin lever I so that the spring L seats the lock pin H in the ground bushing M without shock or jar to the indexing parts.

A demonstration of the gripping power of the three-jaw chuck operated by a heavy spiral spring was recently made. The chuck used was the 9-in. size fitted to one of the maker's No. 6 geared head turret lathes. An 8-in. machine steel disk 1 in. thick cut from bar stock was inserted in the chuck jaws and a 1¾-in. high speed twist drill was forced through the steel plate, followed by a second operation in which a grooving tool ¾ in. wide was let into the blank face on a circle 7 in. in diameter to a depth of ½ in. This was followed by a third operation, the cross slide tool taking a 3/16-in. cut off the entire face of the blank. In performing these operations the back gears were used so that the full belt power was given to the cut. During this test the belt slipped frequently, thus showing that the grip of the chuck jaws was equal to the full belt power of the machine.

German Pig Iron Expansion

A further very considerable growth in the manufacture of pig iron in Germany, says the London Financial Times, may be expected in the course of the next few years, beginning with the present year. Apart from the erection of new blast furnaces in connection with existing iron and steel works, three entirely new iron and steel works of enormous dimensions are approaching completion in Lorraine-Luxemburg at Hagendingen and Esch, and these alone will have a total annual capacity of about 1,600,000 tons of pig iron. The increase in the productive capacity for the whole of the country will be about 5,000,000 tons in three to four years, and the only question is as to where a market will be found for the enormous expansion in the output, although this matter does not appear to cause any concern to the owners of the new works or the promoters of two other large new works. At any rate, the tonnage of pig iron which cannot be placed on the market in the form of manufactured steel will be marketed both in Germany and abroad, and a fund of nearly $200,000 per annum for the forcing of the export trade is already proposed to be formed by the Pig Iron Syndicate for utilization in case of necessity.

The Los Angeles Hydroelectric Plant

The city of Los Angeles, Cal., has recently approved a bond issue amounting to $357,367 to complete the equipment of the hydroelectric project to be operated in connection with the 250-mile aqueduct by which the city water is brought from Owens Lake, near the Yosemite National Park. The generating equipment will be installed at Power House No. 1, located at San Francisco, 47 miles from Los Angeles, to which point current is sent at 60,000 volts. In the power house will be installed three 9375-kva., 6600-volt, 50-cycle, three-phase water-wheel generators running at 200 r.p.m. and two 250-kw., 250-volt direct current water wheel generators used as exciters; ten 3150-kva., single-phase, 50-cycle oil-insulated water-cooled transformers for raising the generator voltage (6600) to that of the transmission, 60,000. In the substation will be installed nine 5000-kva., single-phase oil-insulated, water-cooled transformers for stepping down the transmission voltage to either 33,000 or 16,000 for secondary distribution. The contract for the entire equipment was awarded to the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

Jones & Laughlin to Push Exports

The Jones & Laughlin Steel Products Company, Pittsburgh, will apply for a charter February 26. It will be organized to conduct the export business of the Jones & Laughlin Steel Company, which is building up a heavy trade in its tin plate, wire and other products in Canada and other foreign countries. The business of this character has grown so important that special arrangements have become necessary for conducting it.

The Moore & Scott Iron Works, Main and Howard streets, San Francisco, Cal., is highly gratified with the result of a trial of its patent improved high pressure oil fuel system on a steamship which made a most successful trip from San Francisco to Eureka, Cal. An increased speed of 1 1/10 knots per hour was secured with less fuel than was formerly required burning coal. This apparatus is stated to dispense entirely with the use of steam jets or air compressors in burning oil for fuel. The oil is heated in a coil of pipes until it reaches the temperature of 250 deg., when it is diffused over the furnace by its own pressure.

Four out of five furnaces of the National Tube Company at Lorain, Ohio, are in blast, the No. 1 stack having been blown in January 29.

The La Belle Iron Works, Steubenville, Ohio, which now has ten 60-ton open-hearth furnaces in its steel plant, will shortly place a contract for building another of the same capacity.

National Coating for Wrought Pipe

The January issue of the Bulletin of the National Tube Company, Pittsburgh, Pa., gives an interesting description of National coating, which is a system of protection against external corrosion and electrolysis. This coating can now be applied to pipe from 3 to 18½ in. outside diameter, and preparations are being made to extend its use to include all the sizes of pipe manufactured. The following description of the coating and the manner in which it is applied is taken from the Bulletin referred to:

Corrosive conditions are often so severe that unprotected iron or steel will not last long. Since electrolysis has become a factor, the life of pipe underground is still further jeopardized and the necessity for adequate protection has become more apparent. The National Tube Company has made a special study of the manufacture of slow-corroding steel for pipe, and by a system of inspection and care in manufacture through the various operations from the ore to the finished pipe a soft steel has been developed having an exceptionally high degree of uniformity. This has been further improved by a patented process of hot forging, known as spellerizing, which is applied to the metal in the course of manufacture, by which the surface portion is rendered more uniformly dense and less liable to be pitted. Where no protective coating can be applied, this steel will give the best service. However, it is the nature of iron to go into solution and be oxidized in the combined presence of water and oxygen, the reaction being more or less accelerated according to the amount of free acid and salts in solution and especially where stray electric currents leave the pipe. Against the inroads of such reactions there is no satisfactory remedy except by keeping moisture away from the metal.

The pipe is first cleaned and dried, and while still at a temperature above the boiling point of water it is dipped into a hot bath of special refined bituminous compound and kept there until the pipe has the same temperature as the bath. On removal from the bath the pipe is allowed to drain vertically and cool, leaving the pipe covered inside and outside with an elastic compound, the consistency of which can readily be adapted to the temperature conditions under which the pipe is to be used.

By a second operation, this enamel-like surface is wrapped with a strip of fabric which has been thoroughly saturated with the hot compound. Immediately after being saturated with the compound the fabric is wound spirally over the surface of the pipe, overlapping about 1 in. on each turn, covering and firmly adhering to the body coat. Two or three thicknesses may be applied in this way where desired to meet special condition. The average thickness of ordinary paints or bituminous dips rarely exceeds 1/100 in., but in the case of one-ply National coating the thickness of protection amounts to about 3/64 in.

Exclusion of moisture is the main purpose kept in view in applying National coating to pipe. So long as moisture is prevented from reaching the metal no corrosion nor electrolysis is possible. A much heavier coating may be safely applied to the surface when reinforced by fabric as described. The saturated fabric affords considerable protection against damage to the coating through impact or abrasion and protects the foundation coat, which might otherwise be seriously injured thereby. When the wrapping has been injured by abuse in handling, it can be readily and inexpensively repaired in the field by the application of strips of fabric saturated with the compound.

Compared with cast iron, soft steel pipe may be made more durable by this system of protection so that advantage may be taken of the far greater strength, ductility and lighter weight of soft steel without sacrificing durability under bad conditions on account of the thinner gauge.

It is, of course, necessary to leave the ends of each length unprotected by fabric until the line is assembled. It is very important before the pipe is finally covered to see that all the joints are properly protected by compound and fabric, and that any places that may have been damaged by abuse in handling are repaired. For this purpose extra fabric and compound are furnished with each shipment free of cost.

Mechanical

The Milwaukee Vertical Miller

A Recent Development of the Kearney & Trecker Company, Employing a Solid Head

With a view of securing maximum rigidity in its new vertical milling machine, the Kearney & Trecker Company, Milwaukee, Wis., has employed a solid rigid head and gives special attention to the size of gears used in driving the spindle.

Fig. 1 is a view of the new machine and Fig. 2 gives details of the spindle construction.

As will be noticed from Fig. 1, there is considerable similarity between this new machine and the horizontal-spindle miller which was illustrated in *The Iron Age* July 30, 1908, the differences in the driving and the feed mechanisms being merely those of dimensions only rather than principles. The construction of the knee saddle and the table is also similar to that of the horizontal design, the knee being a box section without the customary slotted top. It is claimed for this type of knee that its use makes a longer cross range available than would be possible with the old type of knee construction. Another departure in the construction of this machine is making the spindle non-adjustable and depending entirely upon the knee for adjustment.

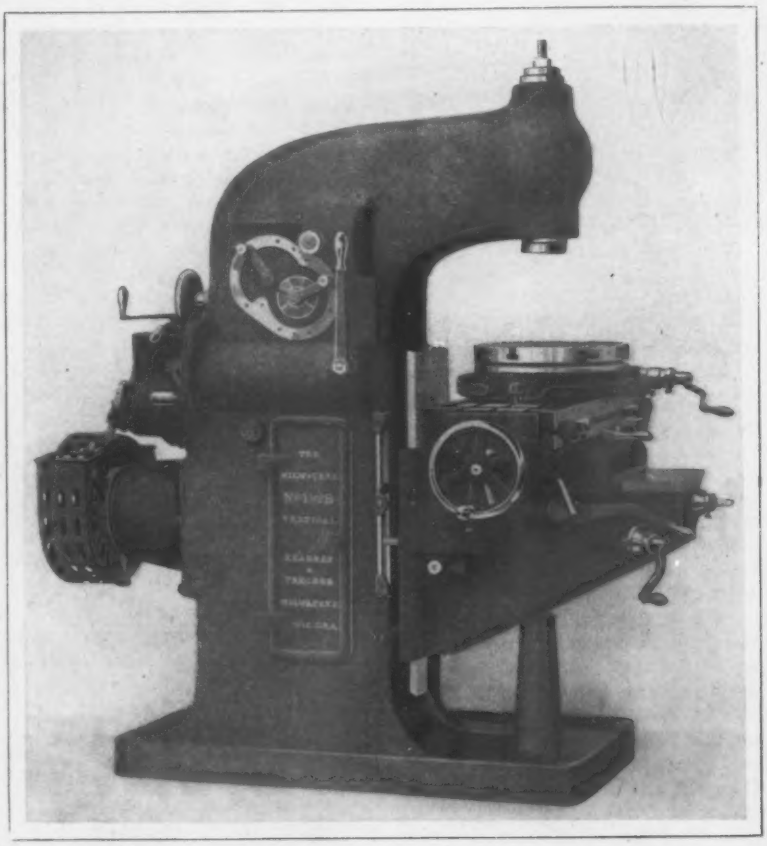


Fig. 1—The New No. 1½ B Milwaukee Vertical Milling Machine Built by the Kearney & Trecker Company, Milwaukee, Wis.

An important feature of this machine is the lubrication system, which is the same as that employed in the builder's horizontal-spindle machine with the addition of such details as are necessary to take care of the change in the position of the spindle. The construction of this part and the means employed for lubricating it are brought out in Fig. 2. The boxes are bronze, with the spindle taper on the lower end and a sliding taper sleeve on the upper end, to allow wear to be taken up by the collar at the upper end of the spindle. The machine is lubricated by the oil that is pumped upward through the pipe *l*, the pump in the machine base being of the same spur gear type that has always been the standard with this company. The oil is delivered by the pump to the perforated distributing pipe *m*, which thoroughly lubricates all of the horizontal bearings and gears, which are so constructed that the oil cascades downward from one bearing to another and flows liberally through them. These bearings are grooved in such a way that the oil can flow freely through them without being stopped at any point, an arrangement which prevents any foreign substance that might be in the oil from lodging in the bearings, since it is washed away by the rapid flow of the lubricant. A hole, *o*, is drilled through the main casting and the surplus oil flows through this into the passage *p*. Engaging with this hole is a horizontal hole, *q*, connecting with the vertical hole *r*, which is plugged at the top to provide an overflow for the surplus oil so that a reservoir is maintained in contact with the upper bearings at the hight of the horizontal hole. The surplus oil flowing through the vertical hole discharges on the gear *s*, lubricating it thoroughly and then flowing downward through the horizontal bearings at the front of the machine, overflowing each pocket successively and cascading downward in the same way as it does for the back bearings.

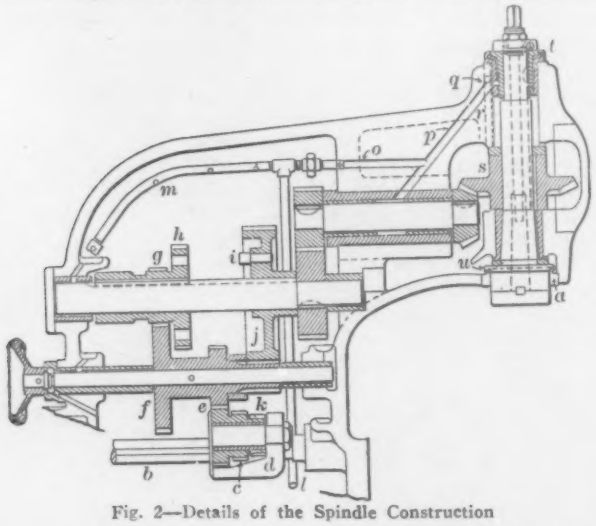


Fig. 2—Details of the Spindle Construction

The grooves in the upper spindle box are so constructed that the oil is carried upward into the annular groove *t*, thoroughly lubricating both thrust collars, and bearings. The oil discharged from the gear *s* flows through the lower spindle bearing upon the collar *u* and is prevented from running downward over the spindle by the collar *a*, which is made oil-tight in the main frame of the machine. The front end of this spindle is of flanged construction with a hardened steel driving collar that can be removed. This permits face milling cutters to be screwed solidly against the flat face of the spindle, which is protected from injury by the hardened collar and therefore maintains its accuracy.

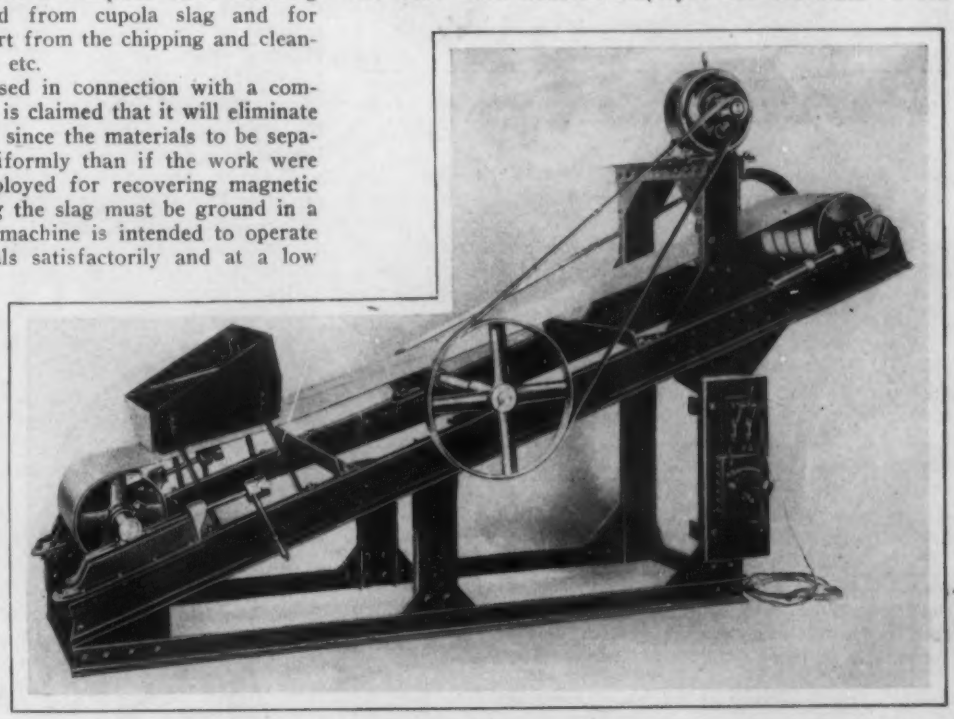
The speed range of this machine consists of 18 spindle speeds, ranging in approximately geometrical progression from 15 to 354 r.p.m. These 18 speeds are secured by the use of only ten gears, one of these being located on the shaft *b*. This meshes with the middle step of the three-step cone pulley *c*, which is an idler carried in the swinging frame *d* that is supported on one side by the shaft and on the opposite side by a pinion so that there is no overhang to the idler. The three steps of the idler pulley are so arranged that they can be engaged successively with the gears *e* and *f* to give six changes of speed. The spindle sleeve gears *g* and *h* are arranged to mesh with *f* and *d* and also slide into engagement with the pin *i* of the large driving gear *j*, which engages with the pinion *k* for slow speeds. This arrangement gives three speed changes, and when these are combined with the six obtained through the cone pulley idler the 18 changes provided are available.

The machine table has an automatic feed of 24 in., an automatic cross feed of 12 in. and can be lowered 18½ in. from the end of the spindle, the vertical feed being also automatic. The work table has a working surface of 11½ x 38⅜ in. and the rotary table measures 14 in. in diameter on the working surface, and 4 in. more over the oil pan and, 5 in. high. The driving pulley is 14 in. in diameter and is intended for use with a 4-in. belt. Its speed is 250 r.p.m., and it is guarded by a perforated sheet metal guard which is so constructed that it can be turned in any position around the pulley to accommodate the varying angles at which the belt may be led from the line shaft. If desired, the machine can be driven from a line shaft mounted on the ceiling of the floor below.

New Magnetic Separator

For use in foundries and wherever the separation of magnetic from non-magnetic material is desired the Standard Sand & Machine Company, Cleveland, Ohio, has brought out a new magnetic separator. This machine can be used in connection with a complete sand handling plant, for recovering sand from cupola slag and for handling floor scrapings, dirt from the chipping and cleaning rooms, gangway sands, etc.

When the machine is used in connection with a complete sand handling plant it is claimed that it will eliminate considerable labor expense, since the materials to be separated will be fed more uniformly than if the work were done by hand. When employed for recovering magnetic material from foundry slag the slag must be ground in a regular mill at first. The machine is intended to operate and to handle the materials satisfactorily and at a low cost. The framework is constructed of structural steel and is made strong and rigid. As will be noticed from the accompanying engraving, the left or feeding end is located at a lower elevation than the discharge end, an arrangement which makes it convenient for the workmen to shovel the material directly into the feed hopper that is located above the conveyor belt. The material which is to be separated falls from the hopper upon the belt and is carried up over the magnetic pulley, where the non-magnetic material is thrown from the belt and discharged some little distance from the end of the machine. This allows plenty of room for the magnetic material, which does not leave the belt until it has been carried around to a point directly underneath the pulley. Another advantage of having the discharge end elevated to such an extent is that clearance for wheelbarrows and other receptacles used to convey the separated material away from the machine is provided.



A New Magnetic Separator for Foundry Use Built by the Standard Sand & Machine Company, Cleveland, Ohio.

The magnetic pulley is 12 in. in diameter and measures 18 in. across the face. The conveyor belt is a five-ply, 18-in. endless rubber belt, which when operated at a speed of approximately 100 ft. per minute gives a capacity of 1500 cu. ft. of material per hour. This belt can be adjusted by two take-ups located at the side of the lower pulley. The amount of power required by the machine is less than 3 hp., the consumption of the magnetic pulley being approximately 375 watts.

An artistic pamphlet on steel axles, covering the standard designs and specifications, has been issued by the Illinois Steel Company, Chicago. The booklet comprises 28 pages. A brief introductory description of the mill practice in the manufacture of axles is followed by a listing of the standard specifications for car and tender axles with descriptions of the several tests and chemical determinations. These are accompanied by illustrations and tabulated data.

High Voltage Outdoor Transformer

For use in small industrial plants located near high voltage transmission lines where outdoor transformers can be employed to distribute the electric power directly from the high voltage line the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has developed a line of high voltage outdoor transformers. These transformers are intended to be mounted on a platform in any convenient manner and connected to the transmission line without any provision for protection from the weather.

In the smaller sizes the transformer is mounted in a case of boiler iron having the seams welded and the low tension outlet bushings are corrugated porcelain, while those on the high tension side are built of porcelain petticoats. The both sets of bushings are sealed into cast-iron flanges which are bolted to the cover in such a way as to provide a water-tight joint. The larger transformers have cases with corrugated iron sides and all the seams welded and the top and the bottom are cast on, while substantial cast-iron covers are bolted to the top. A waterproof gasket is fitted tightly between the cover and the case. The material employed for the sides of the case is said to be affected only slightly by rust and further protection from the weather is afforded by paint. The outlet terminals are the same in these transformers as in the smaller ones, the only difference being that the low tension terminals are brought out on the side instead of up through the cover.

These transformers are shipped in accordance with the company's standard practice of shipping transformers already filled with oil, so that it is not necessary to dry out the transformer in the case and filling with oil is avoided. All that has to be done by the customer when the transformer is received is to remove the blind flanges from the openings to the outlet terminals and the transformer is then ready to be connected to the supply circuit.

An interesting application of these transformers was on the line of the new aqueduct which is to supply Los Angeles, Cal., with water. Here three 40-kva. single-phase transformers were installed on a float for three-phase service. Connections were made to an adjacent high-tension transmission line and the voltage was stepped down for use on an electrically-operated dredge. It is pointed out that this arrangement was found convenient, as the float was towed from place to place readily and anchored there as the work progressed.

The Canton Foundry & Machine Company, Canton, Ohio, will build a new machine shop, 60 x 150 ft., and an electric traveling crane will be installed.

Gasoline-Hydraulic Truck

A Recent Development of the American LaFrance Fire Engine Company, Employing the Manly Drive

The substitution of an hydraulic transmission for change and differential gears, service brakes, clutches, jack shafts or electric motors characterizes a new motor truck built by the American LaFrance Fire Engine Company, Elmira, N. Y., and marketed by the Hydraulic Truck Sales Company, 1777 Broadway, New York City. The number of pedals and levers for control has been reduced to three, and it is emphasized that the employee who drove the horse-drawn truck can be employed to operate the new one. Fig. 1 is a view of the truck, while Fig. 2 shows some of the details of the pump which forms a part of the drive.

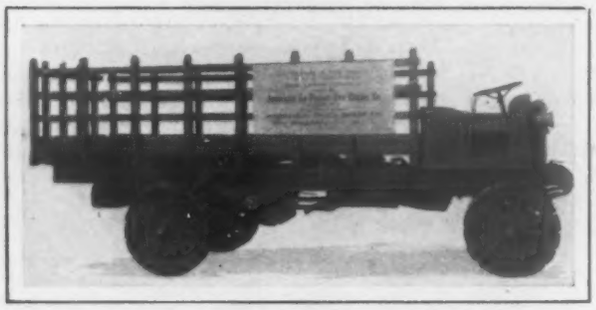


Fig. 1—The La France Gasoline-Hydraulic Truck Sold by the Hydraulic Truck Sales Company, New York City

The gasoline engine used on this truck is not radically different from those of the other motor trucks. It is of the four-cylinder four-cycle type and the cylinders, which have a bore of 5½ in. and a 6-in. stroke, with very large valves, are cast in pairs. The circulation is of the water-cooled pump type. Outside of the engine, the radiator, the body, the wheels, the tires and the emergency brakes all the mechanism on the ordinary truck is eliminated and an hydraulic system of power transmission is substituted. This consists of a pump directly connected to the gasoline engine and two hydraulic motors located one in front of each rear wheel. The pump drives oil through the motors and forces them to turn, the power being transmitted to the wheels by chains and sockets.

Details of the Speed Control

The control and the changing of the speed are accomplished by changing the stroke of the pump, and this can be adjusted from very little up to a maximum, the power developed by the motors being in an inverse ratio to the stroke of the pump. There are five cylinders in the pump and the same number in each motor, the cylinders being arranged radially around the crank shaft, as shown at the left of Fig. 2, which is a section through the pump. The connecting rods which drive the pistons are connected with bushings instead of the pump shaft. The line passes through the center of the pump shaft, the eccentric crank of this shaft and the eccentric bushing as they are shown in this view. The line *a* intersects the line *xx* in the center of the pump and the pump shaft, and this point is also the center of rotation. The pump shaft has an eccentric crank, the center of which is shown where the line *b* intersects the line *xx* and the eccentric bushings have a center where the line *c* intersects the line *xx*. The eccentricity of the bushings is equal to the eccentricity of the crank, or, in other words, the line *b* is equally distant from the lines *a* and *c*. The eccentric bushing can be rotated around the eccentric crank of the pump shaft at the will of the operator independently of the rotation of the pump shaft itself. In the engraving the stroke of the pump is shown equal to the eccentricity of the pump crank shaft plus that of the bushing, and is a maximum. If the bushing were rotated about the crank through an angle of 180 deg. the line *c* would coincide with the line *a*, and as the bushing and the crank shaft would then become concentric the pump would have no stroke at all. The different positions of the bushing between these two extremes give different strokes, so that it is possible to obtain any speed for the truck. The rotation of the crank bushings is accomplished by the use of an auxiliary piston lying parallel to the shaft and supplied with power from the pressure of the pump. This piston is under the control of a pilot valve and is moved at will by a hand lever.

The hydraulic motors employed are the same as the pump, with the single exception that their stroke is fixed and constant, and is equal to twice the maximum stroke of the pump. By moving the central lever between one end of its throw and the neutral position the speed of the motor shaft is varied from zero up to a maximum, while by moving the lever on the opposite side of the neutral position the motion is reversed and any speed ranging from zero to a maximum in the reverse direction is secured, the maximum reverse speed being one-quarter that of the maximum forward one. The driving shaft in the meantime continues to run at a constant speed, regardless of the speed or direction of motion of the driven shaft, the change being in the stroke of the pump pistons. The oil used to supply power to the hydraulic motors is machine oil, which is well adapted to the work, by reason of its lubricating qualities and its freedom from freezing. In use the same oil is used over and over again.

At the right of Fig. 2 is an elementary sectional elevation showing the cylinders and valves of both the motor and the pump and the pipes connecting them. For the sake of clearness only one motor is shown, and that is placed directly in line with the pump and connected to it by the pipes *d* and *e*. On the truck there are two motors, and the only difference is that the pipes lead oil from the pumps to the motors and the oil has a little further to travel. The plungers and the valves of the pump are represented by *f* and *g* respectively. The connection between these two parts is made by passages leading from the head end of the pump cylinders to the centers of the corresponding valve chambers. The motor valves and

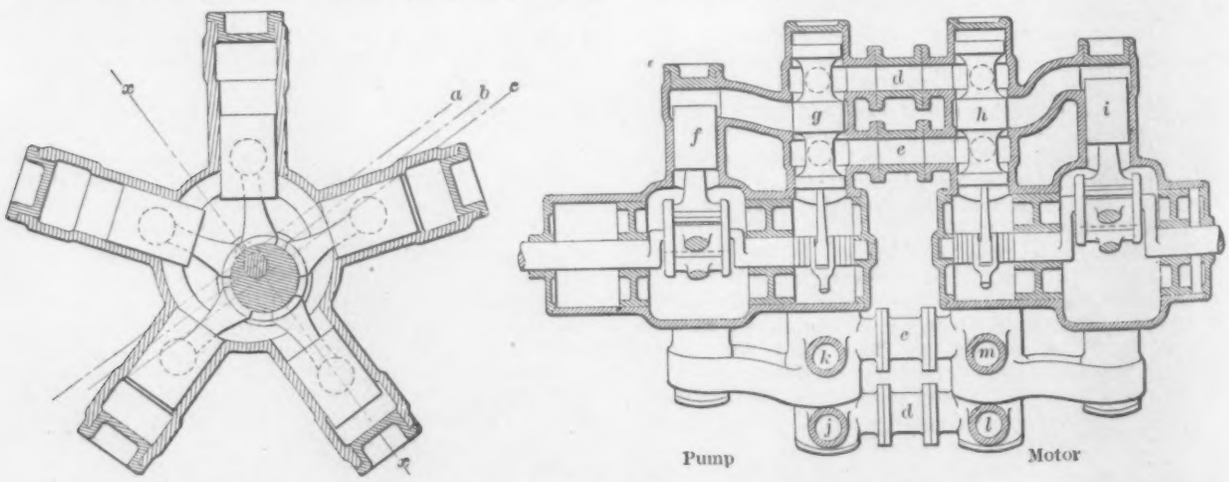


Fig. 2—Sectional Views Showing Details of the Pump Which Forms a Part of the Drive

plungers are represented by *h* and *i*, and here the passages between the valve chambers and the plunger cylinders lead from the center of the valve chambers to the head end of the motor cylinders. The corresponding ends of the two valve chambers are connected by the pipes *d* and *e*, one pipe carrying the oil in one direction and the other in the opposite one. The outer ends of the five valve chambers of the pump are connected by the circular passage *j*, and the inner ends by the circular passage *k*. The five valve chambers of the motor are connected by the circular passages *l* and *m*. When the motor is operating in a forward direction the pipe *d* furnishes a supply of oil to the motor, transmitting it under pressure from the pump, while the pipe *e* returns it from the motor to the pump, thus performing the function of an exhaust pipe. For reversal the pump stroke first passes through the zero point and then the valves change and the oil is pumped in the opposite direction, the pipe *e* becoming the supply and the other one, *d*, becoming the exhaust. If the speed is suddenly checked or reversed the momentum due to running in one direction is absorbed in the transmission itself. A safety valve set to operate at 2000 lb. per square inch opens a by-pass when an excess of pressure is developed, and this acts as a cushion to prevent injury to the machine.

Tests made have shown that the tractive effort of this truck is sufficient to carry a load of 20,000 lb., including the truck, up a 14 per cent. grade with snow up to the hubs of the wheels. Another noteworthy feature of the truck is that it will not be entirely put out of commission by any slight accident occurring to the engine, but will be able to crawl home slowly. This ability to move the truck slowly and under perfect control independently of the engine is of advantage in backing the truck to a loading platform, especially where there is a sharp incline just in front of the platform, and it is necessary to regulate the movement of the truck accurately.

The Riverside Steel Casting Company

The Riverside Steel Casting Company has completed and is now operating its plant at Plank Road and Passaic River, Newark, N. J. The main building of this plant, in which the foundry is located, has a main bay, 40 x 150 ft., and two lean-tos, each 25 x 150 ft., with a power house, 25 x 50 ft. A separate building, 25 x 50 ft., is used for pattern storage. The office building, also separate from the foundry, is 15 x 30 ft., and is built of concrete. The equipment of the plant comprises four crucible steel melting furnaces with a capacity of 40 pots per furnace per day; one large annealing furnace, three drying ovens, one 5-ton electric crane, floor operated, exhaust tumbling barrels, etc. The waste heat from the furnaces is used to generate steam. The property embraces one and one-half acres, has a private siding on the Pennsylvania Railroad and has water shipping facilities. Crucible steel castings are made from 1 to 1000 lb. Thomas Malcolm is president; Porter S. Kinne, vice-president; J. Smylie Kinne, secretary and treasurer.

The Savage Mountain Fire Brick Company, Frostburg, Md., at its annual meeting held January 26 re-elected Charles C. Gorsuch president and John A. Caldwell vice-president and manager. The company reports a prosperous year in 1911 and looks for good business in 1912.

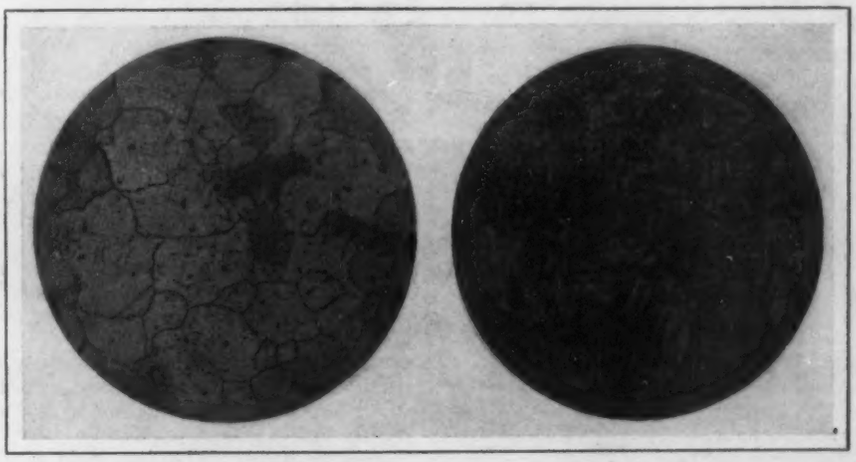


Fig. 1—Structure of Low Carbon Chromium Steel After Slow Cooling.

Fig. 2—Structure of Low Carbon Chromium Steel After Ordinary Annealing.

Heat Treatment of Low Carbon Chromium Steels

The Revue de Metallurgie contains a short note by A. Portevin on a little known quality of certain chrome steels. Previous study, notably by Dr. L. Guillet, has shown that with carbon about 0.1 per cent. and chromium from 7 to 22 per cent. the transformation point on cooling is very low; but the action of a special element, such as chromium, has a double effect on the transformation points. In the first place it displaces the temperatures; secondly, it modifies the speed at which equilibrium is attained and therefore the hysteresis.

If the temperature at which equilibrium is attained depends only on the chemical composition, hysteresis on the other hand diminishes with the speed of the cooling. The question is permissible, therefore, whether with a sufficiently slow cooling the martensitic structure will not disappear and be replaced by that of equilibrium, or at least by one closely corresponding to that of physico-chemical equilibrium.

With this in view two samples of chrome steel were heated to 130 deg. C. and cooled under such conditions that it took 75 hours to reach 100 deg. C. After this treatment they were analyzed, tested for hardness and with the microscope. The analyses were:

	Carbon.	Chromium.
No. 1	0.12	13.04
No. 2	0.12	17.38

The Brinell hardness number was that of an annealed steel of medium carbon, being 140. The Shore scleroscope number varied from 20 to 25. The microstructure of steel No. 2, with a magnification of 175 diameters, is shown in Fig. 1. The etching medium was aqua regia in glycerine, the time being 2 min. It shows a structure similar to that of ferrite with areas of well-laminated pearlite.

Samples were then annealed at 1100 deg. C. in the usual practical way; that is, the time of cooling was only 4 hours. The structure obtained is shown in Fig. 2, and is martensitic with some traces of troostitic pearlite. The hardness as shown by the scleroscope number is doubled, and the Brinell hardness number is trebled. The result of this treatment is altogether similar to that of quenching an ordinary pearlitic or carbon steel.

One can say, therefore, that the martensitic structure in the low carbon chromium steels, due to a state of unequilibrium, can be made to disappear completely with a sufficiently slow cooling. After such treatment these steels have a structure and hardness approaching that of ordinary annealed carbon steels; and a further annealing, as this term is usually understood in the shops, gives the same effect as quenching. It considerably increases the hardness and the martensitic structure reappears. G. B. W.

The Keystone Steel Casting Company, Chester, Pa., is installing a four-ton open-hearth steel furnace in connection with which oil fuel will be used. This furnace will be completed in a few weeks, when the manufacture of open-hearth steel castings will be added to the present crucible steel product. It is also the intention of the company to use this furnace in connection with its crucible practice, it serving for the first stage of the process, the metal then being poured into crucibles and the manufacture of the various classes of special and alloy steels completed in the crucible furnaces.

New Melting Point Determinations

Results of Recent Work with an Electric Vacuum Furnace

The reason why the melting points of many substances that are used in iron and steel metallurgy have not been accurately determined is because a suitable furnace, with temperature control, has not been designed. Careful work at the University at Aachen has developed an electric vacuum furnace in which temperatures can be reached and controlled far in excess of those possible of attainment in the iridium furnace designed by Nernst, and used by the Bureau of Standards at Washington as well as other institutions. This new furnace uses the resistance of carbon as the heating element. A full description and some very interesting results obtained are given in a recent issue of Metallurgie. The temperatures are measured altogether by optical methods, two Wanner pyrometers being used. In the following table are given some results obtained by the experimenter, E. Otto Goecke.

Melting Points of Various Metals, Determined by the Use of a Vacuum Furnace.

Material.	Melting Point.	Pressure.	Remarks.
Gold	1071°C	2 mm.	
Manganese	1247	4 mm.	
Chromium	1514	5 mm.	
Platinum	1750	2 mm.	
Iridium	2224	5 mm.	
Uranium Carbide, UC_2	2425	5 mm.	Sintered at 2360°.
Vanadium Carbide, V_4C_3	2750	5 mm.	
Ferrous Oxide, FeO	1419	5 mm.	In order to prevent reduction by carbon the
Ferric Oxide, Fe_2O_3	1548	4 mm.	oxides were placed on platinum.
Magnetic Oxide, Fe_3O_4	1538	4 mm.	
Oxide of Chromium, Cr_2O_3	2059	Nitrogen, 1 atmos.	The crucible was made of Zr O_2.
Alumina, Al_2O_3	2020	Nitrogen, 1 atmos.	
Uranium Oxide, UO_2	2176	Nitrogen, 1 atmos.	Melting began at 2098°.

A complete series of determinations was run on the well-known Seger cones both in a vacuum and in an atmosphere of nitrogen. The following short table shows the good agreement obtained:

Seger Cone. No.	Pressure.	Temperature given.	Temperature found.
28	Vacuum, 4 mm.	1630°C	1627°C
30	Vacuum, 4 mm.	1670	1672
32	Vacuum, 5 mm.	1710	1715
35	Vacuum, 5 mm.	1770	1780
37	Vacuum, 7 mm.	1825	1837
28	Nitrogen, 1 atmos.	1630	1631
29	Nitrogen, 1 atmos.	1650	1651
32	Nitrogen, 1 atmos.	1710	1718
33	Nitrogen, 1 atmos.	1730	1729
34	Nitrogen, 1 atmos.	1750	1747
36	Nitrogen, 1 atmos.	1790	1793
38	Nitrogen, 1 atmos.	1850	1844
39	Nitrogen, 1 atmos.	1880	1882
40	Nitrogen, 1 atmos.	1930	1926
41	Nitrogen, 1 atmos.	1960	1963
42	Nitrogen, 1 atmos.	2000	2009

Tests were also made on five clays of well-known brands which had melting points given in terms of Seger cone numbers. The agreement was exact.

Very careful experiments were then made with alumina, lime and magnesia. When working in a vacuum the alumina began to vaporize somewhere between 704 deg. and 1739 deg. C. This action was very active at 1905 deg. C.; at 2020 deg. C. the oxide began to melt, and at 2035 deg. C. it was completely molten. Another series was run in nitrogen at atmospheric pressure At 1947 deg. C. it began to sinter; this was very noticeable at 2009 deg. and at 2020 deg. C. it was completely molten. In this latter case no vapor was noticed.

The tests with lime in a vacuum could not be carried to a much higher temperature than 2400 deg. C., for then the heating tube of carbon burned through, probably because of a reaction between the carbon and oxide vapor. At 2102 deg. there was noticeable a rounding of the sharp corners of the sample of lime, which could only be due to the formation of vapor. It strongly sintered at 2320 deg. C.; and at the highest temperature reached, 2448 deg. C, was not melted, but had almost all passed into vapor. The series run in a nitrogen atmosphere showed the presence of vapor comparatively early, namely, at 1742 deg. C. At 1900 deg. C. it melted, and began boiling at 1994 deg. C. The temperature of the furnace remained constant until practically all the lime had boiled away. It then increased and at 2009 deg. C. nothing was left. The difference in the results obtained in a vacuum and in nitrogen are so great that they must be due to the formation of an easily volatile compound of lime and nitrogen.

The experiment with magnesia in the vacuum was carried to 2513 deg. C., but no melting could be observed. The heating tube then burned through. Lively vaporization was first noticed at 2039 deg. C. In a nitrogen atmosphere this was distinctly noticed at 2009 deg. C.; but if ampere numbers and temperatures are used as ordinates it is seen that it begins at 1805 deg. C. At 2455 deg. the heating tube burned through, but the sample was not melted.

If these results are brought together we see that alumina melts at from 2020 deg. C. to 2035 deg. C. both in a vacuum and in a nitrogen atmosphere. The melting point of lime in a vacuum was not reached, but on the other hand it melted at 1990 deg. C. in an atmosphere of nitrogen. This is undoubtedly due to a reaction between the lime and nitrogen. Finally the melting point of magnesia was not reached in either a vacuum or a nitrogen atmosphere.

G. B. W.

The American Shipbuilding Company received an order the past week from the Standard Oil Company for an oil barge for service on the Atlantic coast. This boat will be 258 ft. long, 43 ft. beam and 25 ft. deep.

Alliance Crane Orders

The 200-ton crane ordered from the Alliance Machine Company, Alliance, Ohio, for the Homestead works of the Carnegie Steel Company, as noted in *The Iron Age* last week, is expected to attract considerable attention as it will probably be the largest single trolley electric traveling crane in the world. The lifting capacity of this crane will be 200 tons and the span of the bridge is 50 ft. It will have all the latest improvements in electric trolley cranes and will be of what is known as all-steel construction.

In addition to the above, the crane department of the Alliance Machine Company has recently received orders for the following: One 40, one 45 and one 55-ton for the Appalachian Power Company; 20-ton Lorain Steel Company; 30-ton, Wheeling Mold & Foundry Company; 40-ton, Scullin-Gallagher Iron & Steel Company; 10-ton, Lehigh Valley Structural Steel Company; 10-ton, Midvale Steel Company; one 75 and two 150-ton, Hydraulic Engineering Company of Maine for the power plant at Keokuk, Iowa; 15-ton, Deforest Sheet & Tin Plate Company; 10-ton, Pittsburgh Valve & Fittings Company; 5-ton, Orford Copper Company; 15-ton bridge, La Belle Iron Works; two 7½-ton vertical charging and drawing ingot cranes, soaking department of the Indiana Steel Company; horizontal slab charging and drawing crane and one additional charging trolley, American Sheet & Tin Plate Company; 4-ton pillar crane, General Electric Company; four 5-ton, two 10, one 15 and one 20-ton, Massillon Bridge & Structural Company; one 10-ton, 100 ft. span gantry crane for the same company, and one 10-ton crane for the Carnegie Steel Company. Orders have also been received for two electric coke pushers and levelers, one for the new Koppers plant of the Illinois Steel Company at Joliet, Ill., and the other for the Woodward Iron Company, Woodward, Ala.

Nickel Steel for Bridges.—The Engineering Record refers to the use of nickel steel in Germany for bridges of short as well as of long span. The first case was on the Harburg bridge over the Elbe in 1908, where only a few parts subjected to heavy strain were made of the metal. It was used for the main trusses of a single-track bridge of 103-ft. span on the Oberhausen-Dorsten Railroad in 1910. These trusses were 16 ft. deep. The stiffening trusses of a suspension bridge at Kiel, 387 ft. long and 9 ft. deep, were made of this metal. The double-track structure across the Rhine-Herne canal, near Oberhausen, has recently been constructed of nickel steel; it is 200 ft. long and 25 ft. deep. From 2 to 2½ per cent. of nickel is used.

Cleveland Apprentice School

A co-operative apprentice school for the industrial education of boys employed in manufacturing plants in metal working lines, designed to most efficiently meet the needs of local conditions, was opened in Cleveland, Ohio, the past week under the direction of the educational department of the Young Men's Christian Association of that city. The Cleveland Co-operative Apprentice School is under the direct charge of Homer C. Bayliss. In order to have the advice and assistance of experienced, practical men regarding methods, instruction, etc., an advisory board has been appointed which will virtually have control of the management of the school. This board consists of W. D. Sayle, chairman, president of the Cleveland Punch & Shear Works Company; Robert Wuest, commissioner of the National Metal Trades Association; C. B. Wilson, superintendent of the Ferro Machine & Foundry Company; and John H. Hertner of the Rauch & Lang Carriage Company, automobile builder.

Each apprentice or pupil is enrolled by the company by which he is employed and attends the school a half day each week. Sessions are held from 6:30 to 11 a. m. and from 12:30 to 5 p. m. These sessions will continue 40 weeks of the year. The number of boys that can attend each session is limited to 20, and as about 100 are already enrolled five sessions a week are being held at present. The apprentices now in attendance come from 15 different concerns. As the number enrolled increases additional sessions will be held. So far attendance is nearly all from plants of the machine tool builders, but the scope of the school will gradually be extended to take in boys from other metal working plants. Manufacturers are heartily co-operating with the work and apprentices are generally glad to improve their condition by taking advantage of the opportunities offered.

The schedules are arranged so that no department in a factory is drained of boys at one time. Boys are paid their usual wages for attendance and are docked when absent or late. Weekly reports will be made from the school to the employers in time for their pay rolls. For each boy enrolled in the school the employer pays to the Young Men's Christian Association $20 to cover tuition for the year.

The course of instruction will be made as practical as possible. No text books are used. The printed matter referred to in the school room is limited to trade publications and to manufacturers' catalogues. Various shop problems are to be taken up and given to the boys to solve. Drawing will be taught, not to develop draftsmen, but to make the boys proficient in reading blue prints. In order to keep in touch with the boys and the character of their work, the instructors will spend at least two half days a week in the shops where the boys are employed.

A four-year course of instruction has been prepared. The following synopsis of instruction shows in a general way the scope of the work:

First Year.—Shop arithmetic, spelling, reading, composition, reading blue prints, mechanical drawing, geographical relations of shop materials, civics.

Second Year.—Objective geometry, science—iron, its manufacture and founding; blue prints, sketching, shop practice.

Third Year.—Geometry and algebra, science—physics; shop practice, foreman's question box, drawing, civic and economic history and literature.

Fourth Year.—Trigonometry and applied mechanics, science—shop chemistry; shop practice and management, visiting industrial plants and discussion based on observations of waste and system. Culture—the man as a wage-earner and citizen.

The Southern Bond & Securities Company has been organized at Birmingham, Ala., and has opened an office in the Brown-Marx building, where it will conduct a business in Southern securities. The incorporators are J. M. Dewberry, Forney Johnston and R. D. Johnston, Jr. J. M. Dewberry is president. Mr. Dewberry says: "With our connections we expect not only to be an exchange for high-grade securities, but to be of some service in the material development of the South."

Exports and Imports in 1911

Greatest Iron and Steel Exports in Our History

The December report of the Bureau of Statistics, Department of Commerce and Labor, enables the total figures of our foreign trade, both exports and imports of iron and steel, in the calendar year 1911 to be made up.

The total value of the exports of iron and steel and manufactures thereof, not including ore, was $249,656,411, thus greatly exceeding the high figures of 1910, which were $201,721,903. In 1909 the value of such exports was but $157,674,394. The total value of the imports, however, shows a decrease, being $28,995,600, against $38,907,119 in 1910, and $30,571,542 in 1909.

The value of the December exports, not including ore, was $22,186,996 against $21,547,399 in November. The value of similar exports in December was $2,305,267 against $2,026,789 in November.

The December exports of commodities for which quantities are given totaled 189,752 gross tons. The figures for each month are presented in the following table:

Months	Gross tons.	Months	Gross tons.
January	152,140	July	162,282
February	150,702	August	176,269
March	215,667	September	179,859
April	227,732	October	185,392
May	173,920	November	186,557
June	173,818	December	189,752

The details of exports of the same commodities for December and for the full calendar year, as compared with corresponding periods of 1910, are as follows:

Exports of Iron and Steel.

	December		Twelve months	
	1911	1910	1911	1910
Commodities.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	10,941	11,419	120,799	127,385
Scrap	3,989	4,716	77,918	25,825
Bar iron	1,015	1,115	17,683	18,045
Wire rods	3,925	1,572	22,649	22,869
Steel bars	11,397	8,237	123,349	107,560
Billets, ingots and blooms	17,435	10,880	234,267	58,230
Steel rails	22,874	41,593	420,874	353,180
Iron sheets and plates	20,258	8,365	134,549	102,534
Steel sheets and plates	23,603	14,676	237,423	171,987
Tin and terne plates	6,736	1,043	61,466	12,445
Structural iron and steel	17,728	13,318	223,493	146,721
Barb wire	8,013	6,556	96,754	79,461
All other wire	14,520	7,342	133,008	92,467
Cut nails	946	496	11,422	8,129
Wire nails	9,048	4,259	53,614	42,870
All other nails, including tacks	715	765	12,848	10,202
Pipe and fittings	16,609	13,297	197,506	155,778
Totals	189,752	149,649	2,179,622	1,535,688

In point of quantity, the leading item in the year's exports was steel rails, with 420,874 tons. Next came steel sheets and plates, 237,423 tons; third came billets, 234,267 tons; fourth, structural material, 223,493 tons; fifth, pipe and fittings, 197,506 tons. Tin and terne plates attained very respectable figures, 61,466 tons.

The December imports of commodities for which quantities are given totaled 19,084 gross tons. The figures for each month are presented in the following table:

Months.	Gross tons.	Months.	Gross tons.
January	32,795	July	15,252
February	20,454	August	19,685
March	23,533	September	13,534
April	22,390	October	19,992
May	23,375	November	13,561
June	29,394	December	19,084

The details of the imports of the same commodities for December and for the full calendar year, 1911, as compared with the corresponding periods of 1910, are as follows:

Imports on Iron and Steel.

	December		Twelve months	
	1911	1910	1911	1910
Commodities.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	13,795	19,911	148,459	237,233
Scrap	650	2,621	17,272	72,764
Bar iron	1,607	2,504	26,729	38,230
Billets, bars and steel plates, n.e.s.	1,098	1,794	29,205	46,578
Sheets and plates	378	185	2,453	6,152
Tin and terne plates	410	3,110	14,098	66,640
Wire rods	1,146	1,450	15,483	20,374
Totals	19,084	31,575	253,699	487,971

The imports of iron ore in December were 148,902 gross tons, against 128,019 tons in November. The total quantity of iron ore imported in 1911 was 1,811,732 gross tons, against 2,591,031 tons in 1910 and 1,694,957 tons in 1909.

S. T. WELLER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

New Scrap Baler

Hydraulic Safety Device a Special Feature

The Watson-Stillman Company, New York City, has recently designed a new type of scrap baling press with an hydraulic operating system for the General Electric Company. One of the advantages claimed is the increased price secured for sheet iron scrap, such as is used in the manufacture of electric motors. The difference between the price of this scrap in its bailed and loose forms is approximately $6 per ton, on account of the labor saved in handling the bales. Fig. 1 is a view of the machine, while Fig. 2 illustrates the safety device provided for the press.

The press takes the scrap from the floor, compresses the material, ejects the bale and discharges it upon a runway located beneath the floor. This runway conveys the bale to an elevator from which it is discharged upon another runway and delivered to a freight car. The output of this press when equipped with the proper size of pump and accumulator is 15 to 25 bales, or between 2 and 3 tons of material, per hour, depending upon the skill of the operator.

The press is approximately 23 ft. long, 4½ ft. wide and 4¼ ft. deep. It is set in a pit about 6 ft. deep and 30 ft. long and rests on pedestals which give the necessary room for making repairs. The working parts of the press are two in number, a scrap or pressing box, the top of which is flush with the operating floor line, that has an hydraulically operated cover and two opposed hydraulic cylinders, one for closing the pressing box and the other for compressing the bale and ejecting it. The pressing box measures 60 in. long, 20 in. wide, and 30 in. deep, this last dimension being reduced to 10 in. when the cover is closed. The larger of the two cylinders, which is shown at the left of Fig. 1, closes the front end of the press and at the same time acts as a lock for the cover when it is closed. It is controlled by the same valve as the main or compressing cylinder at the right, which is double acting.

The pressure is supplied to the closing cylinder and the working end of the compressing cylinder from a variable pressure, belt-driven hydraulic pump. The pistons of this pump deliver at a maximum pressure of 1500 lb. per square inch. When the pressure rises above this figure the large pistons are automatically cut out and the smaller ones are brought into play and continue in operation until the maximum pressure of 4900 lb. per square inch is reached, at which time the pump has a maximum duty of approximately 40 hp. The pressure for the cover-closing cylinder and for pulling back the ram of the compressing cylinder is furnished from an accumulator at 1500 lb. per square inch, which is served by a separate small pump and is loaded with approximately 15 tons of pig iron.

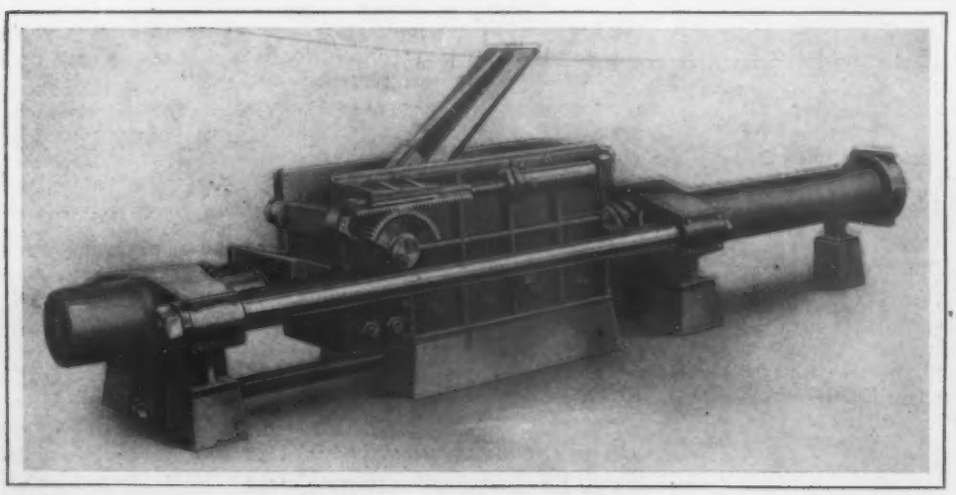


Fig. 1—A New Hydraulic Scrap Baling Press Built by the Watson-Stillman Company, New York City

The action of the press is as follows: Approximately 250 lb. of material is shoveled into the box and the valve A, Fig. 2, is moved. This admits pressure at 1500 lb. per square inch from the accumulator to the cover cylinder, forces the ram outward and closes the cover through the rack and pinion shown at the left end of the pressing box in Fig. 1. A single movement of the valve B, Fig. 2, admits pressure from the pump simultaneously to both the closing and the compressing cylinders. This action first sends the closing cylinder ram forward, until at the limit of its travel it locks the box cover in position. As the pump pressure in the other end of the compressing cylinder rises above that of the accumulator pressure in the pull-back end of the cylinder the compressing ram moves forward until the pump pressure reaches the maximum of 4900 lb. The proportioning of the parts is such that this produces a total pressure of 200 tons upon the bale, which has its dimensions reduced to approximately 20 x 10 x 10 in. and is made so compact that no straps are required. A second movement of the valve B releases the forward pressure in the closing cylinder, thus permitting the compressing cylinder ram to continue to push the bale to the left and out of the press, while at the same time the closing cylinder ram is returned to its initial position. A third and final movement of this valve then releases the forward pressure on the compressing cylinder ram, the bale drops into the delivery chute and the accumulator pressure, which has been constantly acting on the return end of the compressing cylinder ram, brings this part back to its original position.

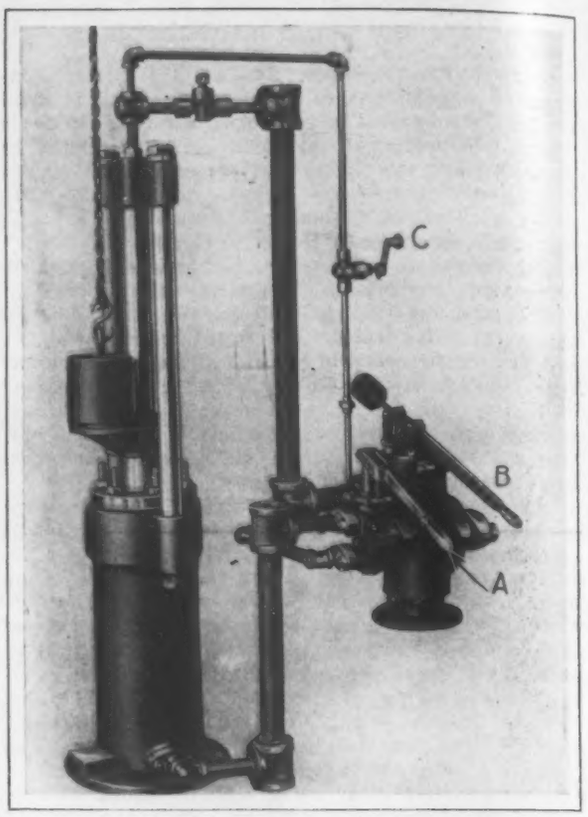


Fig. 2—The Safety Attachment Provided for the Press

To secure protection against overpressure a safety governor, which is shown at the left of Fig. 2, is provided to shut off the pump when the maximum pressure is reached. This governor has two cylinders with pistons of different diameters, the larger being at the bottom and in direct contact with the accumulator pressure. The smaller is directly connected with the discharge pipe of

the pump. As the accumulator pressure is constant on the larger piston the shelf supporting the weight is normally in its highest position, and with the weight at this point the pump discharges through the large operating valve either through the cylinders or back to the reservoir. When the valve is set for admission to the press cylinders the pressure in the top part of the governor is greatly increased. As the bale is compressed the low-pressure plunger is first thrown out automatically, after which the two high pressure pistons continue to work until the maximum pressure of 4900 lb. is reached. At this instant the high pressure is also acting in the top or small cylinder of the governor and overcomes the pressure on the other end, thus forcing the piston with the shelf downward, releasing the weight and causing the high pressure plungers of the pump to be by-passed. By opening the small valve C, shown in the vertical pipe line, the pump is started again.

Where it is desired to deliver the finished bale upon the operating floor a three-cylinder construction is necessary, the extra cylinder being placed vertically under the bale, with its upper end forming the bottom of the baling box. The dimensions and operating system of the press can be varied as may be necessary to meet the requirements of any service conditions.

Reforming the Express Business

The first reform in connection with the investigation undertaken by the Interstate Commerce Commission into the rates, rules and regulations of the express companies of the United States was accomplished February 2 at the hearing before Commissioner Lane. At the suggestion of the commission an agreement was reached whereby representatives of shippers, express companies and of the commission will meet together in a committee and agree upon changes in the form of bills of lading and receipts on the direction, routing and boundary lines for deliveries in cities and on regulations to prevent overcharges.

Shippers attending the hearing regarded this agreement as the most important step ever taken in the direction of reform in the express service of the country, and as foreshadowing other reforms of a far-reaching character. At the conclusion of the hearing an adjournment was taken until February 25.

Another Merchant Furnace to Be Absorbed

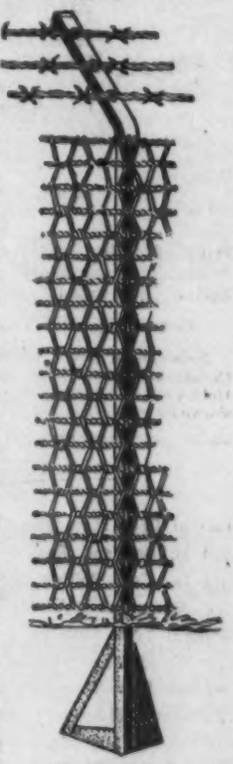
The Youngstown Sheet & Tube Company, Youngstown, Ohio, is negotiating for the taking over of the blast furnace of the Ohio Iron & Steel Company, Lowellville, Ohio. This matter has been considered by the two companies several times in the past without result. It is now probable, however, that a deal will go through for the purchase of the furnace company's property. This will give the Youngstown Sheet & Tube Company a total of four blast furnaces, with an aggregate daily capacity of close to 2000 tons of pig iron. Mary furnace of the Ohio Iron & Steel Company is strictly a merchant furnace, selling its product in the open market, and its sale to the Youngstown Sheet & Tube Company will be following out the tendency of blast furnace owners in the Mahoning Valley to ally themselves with steel making concerns.

The Brown Specialty Machinery Company has removed to 2440 West Twenty-second street, Brown Bros. Building, Chicago. The factory will occupy a space double the size of the old place. The offices, together with those of the Brown Bros. Mfg. Company, will be located in the new office building which was built about three years ago. The manager, Elmer A. Rich., Jr., assumes in addition the office of president and general manager of the Brown Bros. Mfg. Company.

Trade of the United States with Cuba in the year just ended aggregated $168,000,000, having more than doubled during the reciprocity period, which began December 27, 1903. The 1911 exports to the island, according to the figures of the Bureau of Statistics, were about $62,000,000.

New Type of Steel Post

With a view of overcoming the objections of short life, high cost of handling and absence of any scrap value, which have been urged against wooden posts, the American Steel Post Company, Los Angeles, Cal., has developed a new type of pole. This utilizes the company's Carbo all-steel base for various types of fence posts and the present development consists of light, telephone, telegraph and short poles for railway and power purposes. In developing this article the fundamental idea has been to utilize the elastic quality of the material to its fullest extent to cut down unnecessary metal.



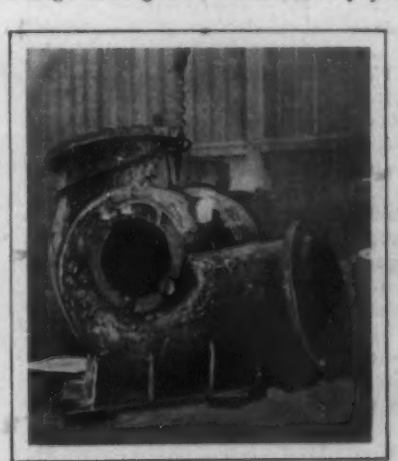
A New Type of Steel Fence Post Made by the American Steel Post Company, Los Angeles, Cal.

The patent base that is employed by its bottom plate fixes the point where the post or pole is held in the ground and acts like springs to remove the strain or shearing force at the ground line. It is pointed out that when the post or pole is set it cannot be pulled out of the ground when a heavy stress is applied to it, but it simply bends over and returns to its original vertical position. Another advantage claimed for the special base used on these posts is that all of the weight of the dirt in the hole is employed to hold the base in the ground so that the hole need only be two-thirds as deep as the ordinary ones. No concrete is employed in connection with this base as the manufacturer points out that it is essential that the upright be left free to move at the ground line and the use of concrete would prevent this. Another advantage of these posts is that their peculiar form enables them to be nested one within the other so that approximately ten times as many posts or poles can be placed within the same space as was the case with wooden poles.

These poles are constructed of a special grade of high carbon steel and the design is such that the cross section is open and easy to paint, being of the right angle type. These poles or posts are sold covered with an asphaltic preparation and the post is standardized to use standard tools and punched to take any kind of fencing.

A Large Bronze Casting

The accompanying reproduction of a photograph shows a large casting which was recently produced in bronze by the Atkinson Company, Rochester, N. Y., weighing between 3500 and 3600 lb. It is for a pump, and is designed to take the place of an iron casing that had been destroyed by corrosion of acid and salty water. The photograph shows the casting in the rough, as it came from the sand, before any chipping was done. It is for use in connection with municipal work in New York City, and is, of course, notable for its size.



A 3600-lb. Bronze Pump Casting

The Princess Furnace Company blew in its furnace at Glen Wilton, Va., February 1.

THE IRON AGE

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The Free List Proposal for Machine Tools

Rarely have the machine tool manufacturers of the country been so stirred by any legislative proposal as by the provision of the Underwood metal tariff schedule which places machine tools on the free list. At Cincinnati on January 27 a meeting was held representing practically all such manufacturers in that district and a committee was appointed to go to Washington and present a strong protest against the summary action proposed. Some encouragement is given by the announcement of the Senate Finance Committee that it intends to give all interests a hearing. Acting upon it, the manufacturers are now marshaling the facts relative to the position of their industry and the real menace of a bill wiping out at a stroke the present ad valorem duty of 30 per cent.

Further testimony to the gravity of the issue thus raised was given at a conference of the Eastern members of the National Machine Tool Builders' Association held at the Hotel Astor, New York, on February 5. It was the opinion of those present that when the facts relating to present and potential foreign competition in their industry were put before the Senate Committee it would be made plain that its status would be seriously affected by the abolition of the existing duty. It has long been recognized that with almost negligible exceptions American machine tools, the product of high-class and well-paid labor, are superior to those of foreign make in both design and construction. But foreign makers of tools now have the advantage in cost of production; with the further advantage of free entry to the United States, our manufacturers may well ask themselves where they and their employees are to come out, despite the superiority of their product. Foreign makers have made their influence felt in marketing their tools in this country, even under moderate demands of trade, and the foreign product would be much more in evidence if real trade activity should set in.

The cheapness of the foreign-made machine is essentially a question of wages. It is this low cost of manufacture in the case of tools of standard design that to a great degree limits the sale of American machine tools in outer markets. The manager of a Japanese exporting house located in New York stated but a few days ago that it was out of the question to compete with German and English machines in Japan and that for this reason its attention had been turned to other products for export. Special machines of certain types, of course, were an exception.

So far as the domestic market is concerned some lines of machinery would be less injuriously affected by the Underwood proposal than others. Probably the automatics and semi-automatics, grinding machinery and specialized types of the standard machine tools would suffer least from foreign competition under any circumstances. But the simpler and cheaper types of standard machines, such as lathes, planers and drills, do not differ sufficiently in construction and detail in favor of American builders to stand against a radically lower price. The European manufacturers would be able to lay down a machine in any part of this country a good deal cheaper than an American manufacturer could produce it, should the tariff be removed.

The home manufacturer would get little relief from the theory on which the makers of the Underwood schedule have proceeded, that the cost of materials entering into machine tools will be lessened by the lower tariff proposed. This factor, if it should materialize,

would be of small moment in the cost of machine tools, which conspicuously resolves itself into a question of wages. The natural recourse of the machine tool manufacturer, with the door wide open to the competition of the low-wage products of Europe, would be in the reduction of wages; but here he is confronted by conditions which for some time have been recognized in that industry—there is no oversupply of skilled mechanics in the United States. Thus a reduction of the wages of the most highly skilled employees of machine tool builders might in some cases result only in the removal of such workmen to shops in other lines of manufacture. But to the great mass of employees in this important branch of machinery production the lowering of standard machine tool prices through the free competition of European tools would carry with it the enforcement of lower wage schedules.

A matter that should not be overlooked in this connection is the broadening of the classification of "machine tools" by the customs authorities. Recent decisions on imported machinery, in classifying it for duty, have thus included woodworking machines, going so far as to cover those used in cutting or stripping the bark from pulp wood. Thus the Government opens the way itself for making this classification cover a great variety of machinery that has never been considered as coming under the category of "machine tools." It may well be believed that with the passage of the Underwood bill the door would be opened for the admission free of duty of all such machines as punches, shears, presses, straighteners, and, in fact, anything capable of performing some mechanical function. The machine tool manufacturers should therefore be supported in their protest against this injustice by the manufacturers of all other kinds of machinery.

It cannot be charged that the machine tool trade has used the tariff to create a monopoly or to eliminate competition. It is conspicuously a business that has been developed by the competitive exercise of the highest types of mechanical skill. In these recent years it has felt the full force of the panic of 1907. Now, when it has a right to expect that, in the alternation of good times and bad, better things are ahead, it is confronted by the threat of a foreign invasion. We are not ready to believe that when the actual conditions are brought out in the hearings about to be held any such radical step will be taken as is now proposed.

The Protection of Inventors

The Inventors' Guild, an association of prominent inventors, adopted an important resolution at a recent meeting held in New York City, addressed to President Taft. It urges him to recommend to Congress the advisability of appointing a committee to confer with experienced representative inventors with the object of promptly accomplishing such reforms in the Patent Office and in the courts which hear and decide patent causes as will result in more effectively carrying out the intention of the Constitution, which provides that "The Congress shall have power to promote the progress of science and useful arts by securing for limited times to inventors the exclusive right to their respective discoveries" and to supplement his recommendations by such executive action as, in his judgment, seems likely to assist in the desired work.

In proceeding as above indicated, the Inventors' Guild has embarked in an undertaking which should have strong support. It is and has long been a serious defect in our patent system that the granting of a patent does not give the inventor more than a right to defend himself if attacked and a right to prosecute if he finds others infringing his patent. Although the Government issues what purports to be a deed of ownership to a valuable piece of property, no safeguards are thrown round the inventor to protect him in the exclusive right which is apparently conferred upon him. The more valuable his patent may be the more is such an inventor likely to be shouldered out of his rights either by those who have greater means than he or who have a better knowledge of the intricacies of the law. The appeal of the Inventors' Guild should be granted, and not only should the President recommend to Congress the advisability of appointing the committee asked, but the recommendation should be promptly acted upon by our national legislators.

American and Foreign Railroad Operations

Railroad freight ton-mileage statistics are not kept abroad with the accuracy and completeness that has long obtained in the United States, and general comparisons of results in different countries have therefore been difficult. The Bureau of Railway Economics, which is maintained at Washington by the railroads, has, however, recently gathered and presented some statistics for the different countries which are of interest. They are presented in its Bulletin No. 24.

On account of the size of the United States, the freight business is large per inhabitant. The number of ton-miles of freight per inhabitant in the United States was 2421 in 1909, which was an increase of 30 per cent. over 1900, while for Group II, comprising approximately the States of New York, Pennsylvania, New Jersey and Maryland, a group of railroad operations comparing conveniently with railroads in certain foreign countries, the average was 2950, which was an increase of 15.5 per cent. over 1900. In Prussia-Hesse, however, the ton-miles per inhabitant was only 606, an increase of 24.7 per cent. in nine years, while in France the number is only 359, an increase of 22.9 per cent. over 1900. For the United Kingdom no statistics at all are available.

This much smaller utilization of railroad facilities is made up, to an extent, by there being fewer miles of railroad per inhabitant in the foreign countries. While in our Group II there is 12.18 miles of line per 10,000 inhabitants, in France there is only 6.35 miles, in Prussia-Hesse only 8.11 miles, and in the United Kingdom only 8.80 miles.

Comparisons between Group II of the United States and the various foreign countries are incomplete, being subject to the data available for the foreign railroads. Comparing with the United Kingdom, we have freight cars per mile only two-thirds those of Great Britain, but have a freight train density three-fourths as great. The tonnage per train is not ascertainable, but the train density is three-fourths as great in Group II, indicating greater facility in train movement. Our revenues per mile of line are one-fourth greater, but this in itself does not indicate whether the revenue per ton-mile is greater. Probably it is lower.

Comparing Group II with France, more conclusions

are available. We have freight cars per mile of line one and two-thirds those of France, freight train density one and one-half times as great, but freight density nearly four and one-half times as great. Accordingly, our tons per freight train are nearly two and three-fourths times as great, showing much greater economy in the use of the facilities. However, with freight density four and one-half times as great, we have in Group II freight revenues per mile of line only two and one-sixth times those of France, so that rates charged per ton-mile are obviously much less here. With Prussia-Hesse a similar comparison is made, though not so striking as is the case with France. Some comparisons of capitalization per mile of line are made between the United States and the foreign countries, but so many details enter into the question, as regards rates paid, market values, etc., that such figures are more useful for argument than for conclusion.

It would appear that what is useful in these statistics is not to prove that our railroads are better or worse than those abroad, but rather, by definite statistics, to point out to American railroad managers what are their problems and where they can look for information by which they may better the position of their roads. It is the function of the Bureau of Railway Economics to gather statistics which will lead to study and improvement in American railroading. Of particular interest in this recent summary is the showing that the utilization of railroads is altogether greater in the United States than in foreign countries. This changes the conditions under which the railroads operate, and it also makes the general railroad problem a much more vital one to the people of the United States than is the case abroad.

Correspondence

The Improvement of Charcoal Pig Iron

To the Editor: Reading the different articles in your January 4 number by iron and steel men has made me regretful that I did not accept your invitation to contribute something on pig iron. Much has been written about how metallography has explained what previously was mysterious regarding qualities of steel, and which was not explicable by a knowledge of the chemical contents usually furnished. Not so much has been done on pig iron, notwithstanding it has generally been conceded that charcoal iron in varying degrees was better than coke iron, in spite of practically identically similar chemical contents. This acknowledged difference, one would think, should have impelled us to investigate to find out wherein the difference lay.

Pig iron producers in recent years have been so occupied in constructing and operating their furnaces to reduce costs and at the same time control percentages of certain elements in their metal that they have lost sight of this quality as found in greatest excellence in some cold blast charcoal brands; in lesser degree in Eastern and Southern warm blast charcoal irons, and in a still smaller degree in the ordinary Lake Superior warm blast charcoal irons. Each of these classes of iron possesses this peculiar quality in degree depending upon furnace lines, ore mixtures, furnace practice, etc. Within the last two or three years some of us charcoal iron men have been brought to a sudden realization of the fact that an extreme attention to sampling and analyzing of iron into grades of a silicon spread of 1-10 to ¼ of 1 per cent. was not meeting the quirements as we should. The investigation that followed has resulted in almost as many interesting surprises as confronted the steel manufacturer. We have found that certain changes in furnace lines have had a marked effect on quality of product of furnaces using Lake Superior ores. Among other important factors affecting quality are a proper ore mixture, volume and temperature of blast.

The quality of coke iron could be improved by following such changes in practice but because of decreased output and increased cost it is questionable if coke iron producers could be induced to follow such practice, for such improved quality would still fall far below that of charcoal iron, because of one basic difference—the fuel. The character of cinder permissible with charcoal affects the hearth temperature as well as the zone of fusion.

The assertions I have made above as to improvement in quality by such simple methods, by some charcoal furnaces, sound bombastic when we recall the marvelous strides in developing coke iron practice; but that development has been largely one of volume of output and life of a lining and reduction of cost by labor saving devices.

REPLACEMENT OF IRON CASTINGS BY STEEL

We charcoal men, facing a question of quality, have spent many thousands of dollars in experimental and research work. If many foundrymen producing iron castings could realize that a large part of the trade gained by the steel casting men would not have been lost if they had not tried to economize by using cheap or unsuitable material, thus sacrificing quality, much of the lost ground could be regained, because superior iron castings can be produced at less cost and for many purposes yield better results. There can be little question that with the use of high quality charcoal iron of dependability better castings could be, and are being, made in some works. I refer particularly to such castings as chilled car wheels, cylinders, chilled rolls, steam fittings, meters, freezing plants, pneumatic engines, pots, retorts, kettles, working and bearing parts of engines (such as slide bars, motion blocks, eccentrics and gears).

There is no casting that cannot be improved by a judicious use in mixtures of a percentage of dependable high grade charcoal irons. Recently one of the largest engine builders wrote me about a rather large casting that, suffering a slight fall, broke in two. A roll manufacturer told me about a roll (when experimenting with cheaper irons) breaking in two by a similar slight jar. I can only attribute such happenings to use of poor materials producing internal strains.

I have before me some samples of flanges of two car wheels of practically identical contents as to silicon, phosphorus, manganese, sulphur, graphitic, combined and total carbons. One wheel had given good service and the other extremely poor service, and the difference in quality was not explained until we reached a high magnification (in this case 500 diameters were used). The two photomicrographs can be read like the open page of a book. If a foundryman wishes to obtain in a casting such qualities as strength, density, resistance to abrasion or shock or to extreme and rapid changes from high to low temperatures, high grade charcoal iron is indispensable in obtaining the best results.

CARBON DETERMINATION FOR EVERY CAST

The loss due to defective castings can be materially reduced by its judicious use. In the research that is being made at our Ashland plant, we determine the silicon, manganese, sulphur, phosphorus, graphitic, combined and total carbons. From the runner we take iron for 1¼ round bars, 12-in. centers, for transverse strength, also make remelt bars for transverse tests and have photomicrographs made of both original iron as it comes from the furnace and remelts, and in addition to taking temperature of running iron and slag we keep the usual blast furnace records.

Among other things this research has convinced us that a foundryman cannot satisfactorily make up his cupola mixture without a knowledge of the carbon contents of the iron used. As a result of this conviction, in addition to the one plant where we are making carbon determinations we are ordering equipment to enable us to make carbon determinations in every cast at all of our plants by the slow combustion method.

STEEL WHEELS AND CAST IRON WHEELS.

I wish to take exception to what the Carnegie Steel Company says on page 46 of your January 4 number about

wheels in its article on "Higher Quality Steels." Many men interested in the question of car wheels have informed me that the steel wheel has been a great disappointment to railroad men, in not only having developed most of the faults of the cheap chilled cast iron wheel now so generally used, but also some faults peculiar to steel wheels. Quick acceleration by the use of steel tired or forged driving wheels as claimed is probably true, the steel being so much softer than wheels properly made of proper material, but it will also wear much easier because softer and thus yield a shorter life, and in the case of the forged steel wheel become dangerous because of the wearing out of the curved part of the flange. The steel wheel is much higher priced than a chilled cast iron wheel made of good material. The steel tired wheel possesses many desirable features, but it is still much highed priced than the forged or pressed steel wheel, which is a higher priced wheel than a chilled cast iron wheel made of iron of proper quality.

The steel wheel was developed because of the need of the steel men for a wider market for their products. Their claims as to the service the new wheels would give have not been approached by actual service. Not that many manufacturers of chilled cast iron wheels are giving satisfaction with their wheels, sometimes made of 75 per cent. old car wheels, and the other 25 per cent. made up of other scrap iron, some scrap steel and 10 per cent. coke iron. Many motive power men of railroads are beginning to appreciate that the condition of the chilled wheel practice has been brought about by the lowest bid getting orders, practically regardless of quality. The question of quality has only recently begun to be appreciated by some railroads.

WM. WILKINS,
General Superintendent Iron Department,
Lake Superior Iron & Chemical Company.

DETROIT, Mich., January 29, 1912.

American Machinery in Brazil

To the Editor: In connection with the valuable article by T. P. Gourley on "American Machinery in Brazil," which appeared in the issue of *The Iron Age* of February 1, it may be of interest to note that the interior trade in mining, saw mill and agricultural machinery, as well as supplies in general, now largely passes through the port of Manaos, on the Amazon River, about 1000 miles from its mouth. To Americans, however, this place is very little known. It and large tracts of the surrounding territory have been developed almost entirely by British and German capital, and the distributing trade is in the hands of British and German companies. Some export houses in New York and other cities on the Atlantic seaboard have of late, however, been devoting some attention to this important district, and the opportunities for an extension of American influence there appear to be promising. The more this can be cultivated by individual concerns in the United States, the greater will be the prestige of American machinery and other commodities as a whole. C. A. T.

Problems in Maintaining Piece Prices

How One Rate Was Upset by a Boy's Initiative

Few exponents of industrial efficiency would dispute the statement that a piece price, or a premium or bonus basis, once established, should never be cut, unless equipment or methods be introduced beyond those created by the operative for his individual work. And under no circumstances should earnings be reduced or the intensity of labor be increased to secure the same financial returns. In order to carry out these systems, as compared with day labor, the workman must have the stimulus of endeavor to earn more for himself. The more he produces the greater the profits of his employer. The experts would undoubtedly emphasize the maxim: Be sure in the beginning that the price is right, and then go ahead. But never backslide by amending an agreement with an employee. This theory is unassailable in a great majority of cases, though certain unusual conditions of product and the personnel of working people may exist which demand a different treatment.

Extraordinary circumstances may arise which demand careful, tactful handling. A well-known manufacturer, whose ethical standards in the conduct of his plant are high, tells of an instance which demonstrates the embarrassments which may attend a strict adherence to the unbreakable price in piece work. One operation in the manufacture of an important product of his factory was to remove the burr from drill holes on both sides of a very small steel part, and a dozen boys or so were employed on the job. Each face was ground on the outer surface of a grinding disk. The boy took a piece from a box, arranged it in his hand (a clumsy operation because of the small size), touched it gently to the disk, turned it in his hand, touched the other face to the wheel, and dropped the finished piece into a second box. Then he reached for another blank. Working diligently on a piece price, the average earnings were about $1.25 a day. In replacing the emery paper on the disk it was economy to renew both sides at one time, but only the outer surface was used in the work.

One day the manufacturer, happening to be in a factory room on the ground floor, saw a boy's face peering in through a window. "Give me a job, mister?" the boy asked. It was a bright face, and the man decided to take on the applicant, and told him to report at 7 o'clock the next morning. When the owner arrived that day the superintendent met him with the question, "What's the new kindergarten department?" "I don't get you," was the answer. "What's the children's department?" the superintendent persisted, and finally produced the new boy, a little chap in knickerbockers. He must have stood on a box to have been visible through the window the day before. He was put on the disk grinding job.

In the afternoon the superintendent appeared at the office with the remark: "I'll say no more about kindergartens; get me some more of them. That boy you hired is earning $4 a day already." The owner investigated the department and found a singular state of affairs, and one fraught with perplexing possibilities. Every boy in the gang was working on a new system. The newcomer had tried the prevailing method, but it did not suit him, and he adopted a way of his own. He picked a piece from the box with his right hand, touched it to the back of the disk instead of the front, transferred it to the other hand, and touched the other face to the front of the wheel, while he picked up another blank with his right hand. The cycle of operation was perfect, and the speed of production was tripled. Earnings mounted rapidly, and his associates immediately followed his lead.

It was a puzzling case to handle. According to the rules of the factory a piece price could not be changed excepting where improved equipment or methods were provided by the management. One boy had established a new system, and should not be the loser for his enterprise; but his older associates were not entitled to the resultant heavily increased earnings. Yet if one operator should be continued at the old price all would have to be. The extraordinary wage would threaten the organization of a large factory, for discontent would be bred. Moreover, some of the boys themselves would be spoiled for other work within their skill, which would naturally come to them later. So the new boy was taken from the job and given a good chance on other work. His reward was the resolution of his employer to develop and encourage a mind which had shown so marked a degree of initiative.

The solutions of such problems as this mark the difference between broad-minded, capable management and that of men of narrower viewpoint. To fail in an emergency, even in what may seem to some a petty circumstance affecting unskilled labor, and boy labor at that, may mean the disorganization of an entire shop system. Workmen analyze their superior officers, sometimes unjustly and with bigotry, but usually with considerable acumen. And their analysis is generally based on concrete cases which come to their attention.

The E. & G. Brooke Iron Company has decided to blow out its furnace at Birdsboro, Pa. While the date is not definitely decided upon, depending on the working up of some stock on hand, the furnace will be out before the close of the present month.

Ferrosilicon Prices in 1911-12

Having had occasion to go over our files for 1911-12 to get the prices quoted on ferrosilicon, we give the tabulation below for the benefit of those readers who may be interested. The dates given are those of the issues of *The Iron Age* in which appeared the prices named, which are per ton of 2240 lb.

	At Pittsburgh,	At furnace, Jackson, Ohio, or Ashland, Ky.		
	50	10	11	12
1911.	per cent.	per cent.	per cent.	per cent.
January 5	$54.00	$23.00	$24.00	$25.00
January 12	54.00	23.00	24.00	25.00
January 19	54.00	23.00	24.00	25.00
January 26	54.00	23.00	24.00	25.00
February 2	55.50	23.00	24.00	25.00
February 9	54.50	23.00	24.00	25.00
February 16	54.50	23.00	24.00	25.00
February 23	54.50	23.00	24.00	25.00
March 9	53.50	23.00	24.00	25.00
March 2	54.50	23.00	24.00	25.00
March 16	53.50	23.00	24.00	25.00
March 23	53.50	23.00	24.00	25.00
March 30	53.50	23.00	24.00	25.00
April 6	53.00	23.00	24.00	25.00
April 13	53.00	23.00	24.00	25.00
April 20	53.00	23.00	24.00	25.00
April 27	53.00	23.00	24.00	25.00
May 4	52.50	22.00	24.00	25.00
May 11	52.50	22.00	24.00	25.00
May 18	52.50	22.00	24.00	25.00
May 25	52.50	22.00	24.00	25.00
June 1	52.00	22.00	24.00	25.00
June 8	52.00	22.00	24.00	25.00
June 15	52.00	22.00	24.00	25.00
June 22	51.50	22.00	24.00	25.00
June 29	51.50	22.00	24.00	25.00
July 6	51.50	22.00	24.00	25.00
July 13	51.50	22.00	24.00	25.00
July 20	51.50	22.00	24.00	25.00
July 27	51.50	22.00	24.00	25.00
August 3	53.00	23.00	24.00	25.00
August 10	53.00	23.00	24.00	25.00
August 17	53.00	23.00	24.00	25.00
August 24	53.00	23.00	24.00	25.00
August 31	53.00	23.00	24.00	25.00
September 7	53.00	23.00	24.00	25.00
September 14	57.00	23.00	24.00	25.00
September 21	57.00	23.00	24.00	25.00
September 28	58.00	23.00	24.00	25.00
October 5	58.00	23.00	24.00	25.00
October 12	59.00	22.00	23.00	24.00
October 19	60.00	22.00	23.00	24.00
October 26	62.00	22.00	23.00	24.00
November 2	62.00	22.00	23.00	24.00
November 9	64.00	22.00	23.00	24.00
November 16	65.00	22.00	23.00	24.00
November 23	65.00	22.00	23.00	24.00
November 30	68.00	21.00	22.00	23.00
December 7	68.00	21.00	22.00	23.00
December 14	70.00	21.00	22.00	23.00
December 21	70.00	21.00	22.00	23.00
December 28	70.00	21.00	22.00	23.00
1912.				
January 4	70.00	21.00	22.00	23.00
January 11	70.00	21.00	22.00	23.00
January 18	70.00	21.00	22.00	23.00
January 25	70.00	20.00	21.00	22.00
February 1	70.00	20.00	21.00	22.00

The present price of $70, Pittsburgh, for 50 per cent. applies to lots less than 100 tons.

The National Fireproof Window Association

The annual meeting of the National Fireproof Window Association was held in the Hotel Astor, New York, on Monday and Tuesday of this week. The principal matter under consideration was the improvement of metal window construction, not only to secure smooth and easy operation, but further to add to its value as a fire retardant. The meeting was opened by President John J. Grace, and among those taking part in the discussion were Thomas Lee, Cincinnnati; O. Hoffman, Milwaukee; E. F. Wilkinson, Philadelphia; N. E. Parrish, Buffalo, and M. S. Wentergren, New York City. At the present time there are features of construction used in the product of different manufacturers that if open to use by all would prove acceptable to the underwriters, and one of the important obstacles to the production of better windows would be removed. While the meeting was for members only, there was no difficulty in securing information to the effect that substantial progress to the desired end had been made. The officers elected for the ensuing year are: President, John J. Grace, Brooklyn; treasurer, M. S. Wentergren New York City; secretary, E. F. Wilkinson, Philadelphia.

The Lackawanna Railroad is receiving bids for a new bridge which is to be 1800 ft. long. It will have 10 spans and will require several thousand tons of reinforcing bars and about 600 tons of structural steel. The construction will be almost entirely of concrete.

Wasteful Practices in Fuel Utilization

The general indifference to the waste of fuel and to the loss of life in fuel mining operations was emphasized by Reginald Pelham Bolton, consulting engineer, New York, in his presidential address before the American Society of Heating and Ventilating Engineers. Extracts from the address follow:

In wooded districts vast quantities of unused lumber rot on the ground, and along rivers and on the sea coast driftwood and wreckage litter the shores. Such materials are little utilized, though driftwood is sold in New York City at $6 a barrel, and small oaks and hickory cut to length bring $16 to $19 a cord. In portions of the country where peat could be had for the cutting, coal is bought to be burned, and I recently saw the waste of a wood-working factory being dumped into a fill in a mill using bituminous coal at $3.50 per ton.

Under proper furnace arrangements the rejected ashes, which contain a considerable percentage of unburned carbon, combined with the waste wood and paper, can be utilized effectively with the garbage of a city, to contribute more than the cost of the collection, in providing power for other purposes. The waste materials of a city the size of Havana would, under proper conditions, afford power for all municipal water pumping and sewage disposal.

Let us remember that for every ton of coal taken out about an equal amount is necessarily abandoned in the mine, and that a large amount of available lumber is also destroyed or abandoned in the same process of extraction. Every year's working of the coal measures increases the difficulties of coal winning and adds to its cost. The time must inevitably come when legislation will restrict the right of the individual to waste fuel, in any direct and eventually even in any indirect manner, and we may well imagine that the work of the heating engineer will at that time become of prime importance to the welfare of the nation.

The cost of coal is not paid in money alone, but in an inevitable price of human life and of injury to our fellow creatures. The terrible percentage of the loss of life to the tonnage raised which obtained in the past has been ameliorated only in the mere proportion which the number bears to the increasing tonnage raised, and not in the aggregate. It remains a fact that about 2000 lives are sacrificed each year in the production of the 500,000,000 tons of coal which we partly use and which we partly waste; and that 5000 persons, most of them hard-working men having others depending upon their labor, are maimed and injured.

In the homes of New York City alone, in which upward of 6,000,000 tons of coal are annually burned for the comfort of their occupants, the effect of 3,000,000 tons of which is largely thrown away, the waste represents a loss of 10 human lives, while the annual coal consumption of Greater New York has involved as its share of the annual loss of life 68 persons killed and 170 sorely hurt or crippled. For no other material in common use do we pay so dearly in human life and limb, yet in the use of no other material is so little care exercised, so little relative economy practised, so little educative method followed.

Coal is really a common possession, a heritage of the past to our present times, a priceless gift of ages of slow accumulation, which is disappearing not only by mere necessary usage, but also in great part by reckless and ignorant misuse. It should be thought a high crime against the community to contribute to the injury and deprivation of our children, whose welfare is bound up in the provision which nature has made for our own and for their benefit.

American Institute of Mining Engineers

The American Institute of Mining Engineers will hold its midwinter meeting in the United Engineering Building, New York, February 19, 20 and 21. This meeting was formerly devoted to business. It is the intention this year to enlarge its scope by the reading and discussion of papers and also by promoting social intercourse among the members. On the evening of February 19 there will be a general reception in the Institute rooms. On February 20 there will be morning and afternoon sessions, and also on February 21. On Tuesday evening, February 20, there will be a dinner at the Plaza Hotel to members and their guests.

Progress of Savings Bank Life Insurance in 1911

The Massachusetts Savings Insurance League, 161 Devonshire street, Boston, reports good growth of this movement in 1911. There was a gain of about $600,000 of insurance in force, and the amount of insurance at the present time is over $2,100,000. A net gain of 1842 in the number of policyholders was made, so that the number now exceeds 5500.

On August 1, 1911, the Berkshire County Savings Bank of Pittsfield established an insurance department. This is one of the strongest savings banks in Massachusetts, and is the third to open such a department. It has awakened much interest in savings bank life insurance in western Massachusetts, and sixteen agencies have been established in Berkshire County. The savings banks of the commonwealth have shown an increasing interest, and there are now thirteen savings banks which have established public agencies for the insurance departments. Six of these agencies were established in 1911.

From the beginning, about three years ago, savings bank life insurance has had the cordial cooperation of manufacturers, who have established agencies in their factories for the benefit of their employees. There are now nearly 180 such agencies, nearly 60 of which were established or arranged for in 1911. The cooperation of manufacturers has also been manifest through the organization of mutual benefit associations providing for death benefits through policies in savings bank life insurance, numerous employers paying an amount equal to that paid by their insuring employees during the year.

The dividends for the year beginning 1911 have recently been declared by the insurance departments of the Whitman Savings Bank and the People's Savings Bank of Brockton. On the monthly premium policies these dividends amounted in the first year to 8⅓ per cent. and in the fourth year they amount to two full monthly premiums, or 16⅔ per cent. This fourth year dividend makes the cost of these policies from 30 to 35 per cent. less than the weekly premium policies of the large industrial companies. The dividends on the annual premium policies, which are strictly intermediate policies, are increased from 60 per cent. to in some cases 100 per cent. over the dividends of a year ago. These excellent dividends make these annual premium policies not only cheaper than the intermediate policies of the industrial companies, but also cheaper, in most instances, than policies issued by the old line companies.

One just criticism of the industrial companies was the heavy lapse rate on their industrial business. The savings insurance banks, through the cooperation of the agencies, have been able to reduce the lapse rate of their insurance to a minimum. A comparison of the amount of business lapsed in the Whitman and Brockton banks with the total amount of issued business during the year shows that the lapse rate of savings bank life insurance was fifteen per cent. A similar comparison shows that the percentage of lapse in the industrial business of one very successful insurance company was 65 per cent. and in another was 78 per cent. In one of the largest agencies for savings bank life insurance—that of the United Shoe Machinery Company, Beverly—the lapse rate covering a period of over three years has been less than 6 per cent. of the business issued during that time.

It is aimed to conduct the insurance business of the banks in such a manner that no unnecessary expense shall be incurred and the interests of the policyholders shall be most carefully conserved. The amount of over-the-counter business at the agencies and at the banks is steadily increasing. The savings banks of Massachusetts are becoming more and more interested in the possibilities of this work, and other States are considering the adoption of similar legislation.

The Lucknow Iron & Steel Company, Harrisburg, Pa., operating the Lucknow Forge and the Pine Iron Works, has been adjudged bankrupt, on petition to the United States District Court, Philadelphia. John J. Caine, of J. J. Caine & Co., and G. Herbert Leaf, of E. B. Leaf & Co., Philadelphia, have been appointed receivers. A petition has been presented to the court to permit the plant to be operated by the receivers.

Pittsburgh and Vicinity Business Notes

The Keystone Tube Works, Inc., Connellsville, Pa., which recently increased its capital stock from $200,000 to $300,000, states that it is not the intention to make any additional improvements in the first six months of this year. The company manufactures electric seamless round and square tubing, cold-drawn smooth welded tubing, etc., for agricultural, bedstead and special purposes.

The Reinforced Tile Roof Company, Youngstown, Ohio, has received a contract from the Baldwin Locomotive Works for roofing its new erecting shop at Eddystone, Pa., with Re-Ti-Co tile. The contract involves approximately 5½ acres of roof. The Reinforced Tile Roof Company operates plants at Youngstown, Ohio, and Wilmington, Del.

The Pittsburgh Safe Company, which operates a plant at Connellsville, Pa., in the manufacture of burglar-proof safes, reports that it operated nearly full during 1911, its sales having been larger than for the previous year. This company is receiving orders for safes from Canada.

The Krupp Motor Car Company, Pittsburgh, has been organized and plans are being prepared by Irwin & Witherow, engineers, for the erection of a plant to be built at Koppel, Ambridge or Rochester, Pa. It is expected the site will soon be selected and bids asked for the buildings and equipment. The machine shop and assembling room will be 85 x 300 ft., two stories; administration building, 85 x 85 ft., five stories; general assembling and paint shop, 85 x 100 ft., two stories; shipping department, 85 x 200 ft., two stories; storage and warehouse, 85 x 200 ft., two stories.

The National Roll & Foundry Company, Avonmore, Pa., has received a contract for a cold mill to be installed in the sheet and tin plate works of the Follansbee Brothers Company, Follansbee, W. Va.

The offices of E. A. Craig, Southeastern manager of the Westinghouse Air Brake Company and Traction Brake Company, have been removed from the general offices at Wilmerding, Pa., to 308 Westinghouse Building, Pittsburgh, Pa.

The H. W. Johns-Manville Company has been obliged by the rapidly increasing local demand for its asbestos, magnesia and other products to remove to larger quarters in Pittsburgh. This branch of the company is now occupying the entire eight-story building at the northeast corner of Wood street and First avenue, which has been leased for a term of years. The size of this building is 31 x 96 ft.; it has a total floor space of 23,808 sq. ft., and being built of stone, reinforced concrete and steel is one of the most substantial structures in the downtown section of Pittsburgh.

The Penn Bridge Company, Beaver Falls, Pa., has received a contract for a set of lock gates in the St. Mary's River at Sault Ste. Marie, Mich., to cost about $125,000.

The report that the American Steel & Wire Company is buying additional land at Donora, Pa., on which $200,000 will be spent on improvements and additions to existing works at that place is officially denied. Nothing in regard to additions or improvements to any of the various plants of the company has been definitely settled.

The Enterprise Enameling Company, Bellaire, Ohio, will build an addition to its dipping plant.

The Elverson Ore & Stone Company has been incorporated, with James H. Gledhill as president and general manager, for the purpose of opening up the old iron mines at Falls of French Creek in Chester County. The mines were formerly operated by the Pottstown Iron & Steel Company, but have been idle for about 15 years. Poor management is said to have been the cause of closing down the mines at that time, as the deposit is far from being exhausted. A long lease of the mines has been secured from William M. Potts by the new company, which expects to have them in operation this month. They are located about 200 yards from the Wilmington & Northern Branch of the Reading Railroad, and a trolley line on which ore cars will be run from the mines to the steam railroad will be built.

Pig Iron Production

The January Gain Was Slight

Active Capacity on February 1 Was 3,500 Tons a Day More than on January 1

January showed but small increase over the December rate of pig iron production. The total output of coke and anthracite iron was 2,057,911 gross tons last month, or 66,384 tons a day, against 2,043,270 tons, or 65,912 tons a day, in December. The increase was thus 472 tons a day, whereas the capacity active January 1 pointed to an increase of 1000 tons a day. At a number of plants, in part because of the severe weather, there was a letting down of output last month. However, February promises a considerable increase in production, as there was a net gain of 13 in number of furnaces in blast. The daily capacity of the 227 coke and anthracite furnaces active February 1 was 71,103 tons, as against 67,642 tons a day for 214 furnaces on January 1. The net gain in number is thus 13, and in daily capacity 3,461 tons. The gain in number of furnaces is just the gain in active furnaces of the United States Steel Corporation, the changes among all other producers of pig iron last month exactly balancing.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, beginning with January, 1911, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons.

	Steel works.	Merchant.	Total.
January, 1911	36,401	20,351	56,752
February	42,349	21,741	64,090
March	48,970	21,066	70,036
April	47,805	21,031	68,836
May	42,270	18,809	61,079
June	42,708	16,877	59,585
July	42,472	15,369	57,841
August	47,120	15,030	62,150
September	49,696	16,207	65,903
October	50,351	17,460	67,811
November	48,430	18,218	66,648
December	46,885	19,027	65,912
January, 1912	47,844	18,540	66,384

Output by Districts

The table below gives the production of all coke and anthracite furnaces in January and the four months preceding:

Monthly Pig Iron Production—Gross Tons.

	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)	Dec. (31 days)	Jan. (31 days)
New York	114,418	122,680	122,051	126,687	118,783
New Jersey	.....	.....	.....	.....	.....
Lehigh Valley	81,728	85,958	78,379	73,085	66,497
Schuylkill Valley	52,546	55,716	59,058	68,373	70,323
Lower Susquehanna and Lebanon Val.	36,687	37,687	40,158	39,818	41,334
Pittsburgh district	482,013	529,872	478,623	474,266	495,099
Shenango Valley	82,879	92,997	95,205	99,483	117,987
West. Penn.	98,324	101,030	87,689	103,138	106,708
Maryland, Virginia and Kentucky	49,243	55,768	51,659	48,501	45,716
Wheeling district	92,130	100,529	91,172	104,549	121,561
Mahoning Valley	213,872	228,248	208,991	210,903	218,221
Central and North Ohio	131,020	135,004	137,796	141,341	140,022
Hocking Valley, Hanging Rock and S. W. Ohio.	16,785	24,750	22,089	23,680	32,495
Chicago district	289,198	288,581	288,274	268,362	245,046
Mich., Minn., Mo., Wis., Col., Wash.	61,276	68,064	58,398	73,707	69,351
Alabama	149,238	150,219	153,901	161,884	145,830
Tenn., Georgia and Texas	25,745	25,044	25,990	25,493	22,938
Total	1,977,102	2,102,147	1,999,433	2,043,270	2,057,911

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons.

	Pig. Total production.			Spiegeleisen and ferromanganese.		
	1910	1911	1912	1910	1911	1912
January	1,773,201	1,128,448	1,483,153	19,538	8,360	22,622
February	1,620,539	1,185,782	.....	21,396	12,821	.....
March	1,739,212	1,518,063	.....	25,591	11,784	.....
April	1,669,898	1,434,142	.....	22,304	10,657	.....
May	1,619,283	1,310,378	.....	26,529	13,641	.....
June	1,549,112	1,281,241	.....	27,680	22,611	.....
July	1,462,689	1,316,646	.....	22,924	17,067	.....
August	1,442,572	1,460,610	.....	25,756	14,579	.....
September	1,410,221	1,490,898	.....	15,151	17,757	.....
October	1,419,624	1,560,884	.....	8,500	19,697	.....
November	1,242,804	1,452,907	.....	9,032	19,678	.....
December	1,113,174	1,453,446	.....	12,178	20,698	.....

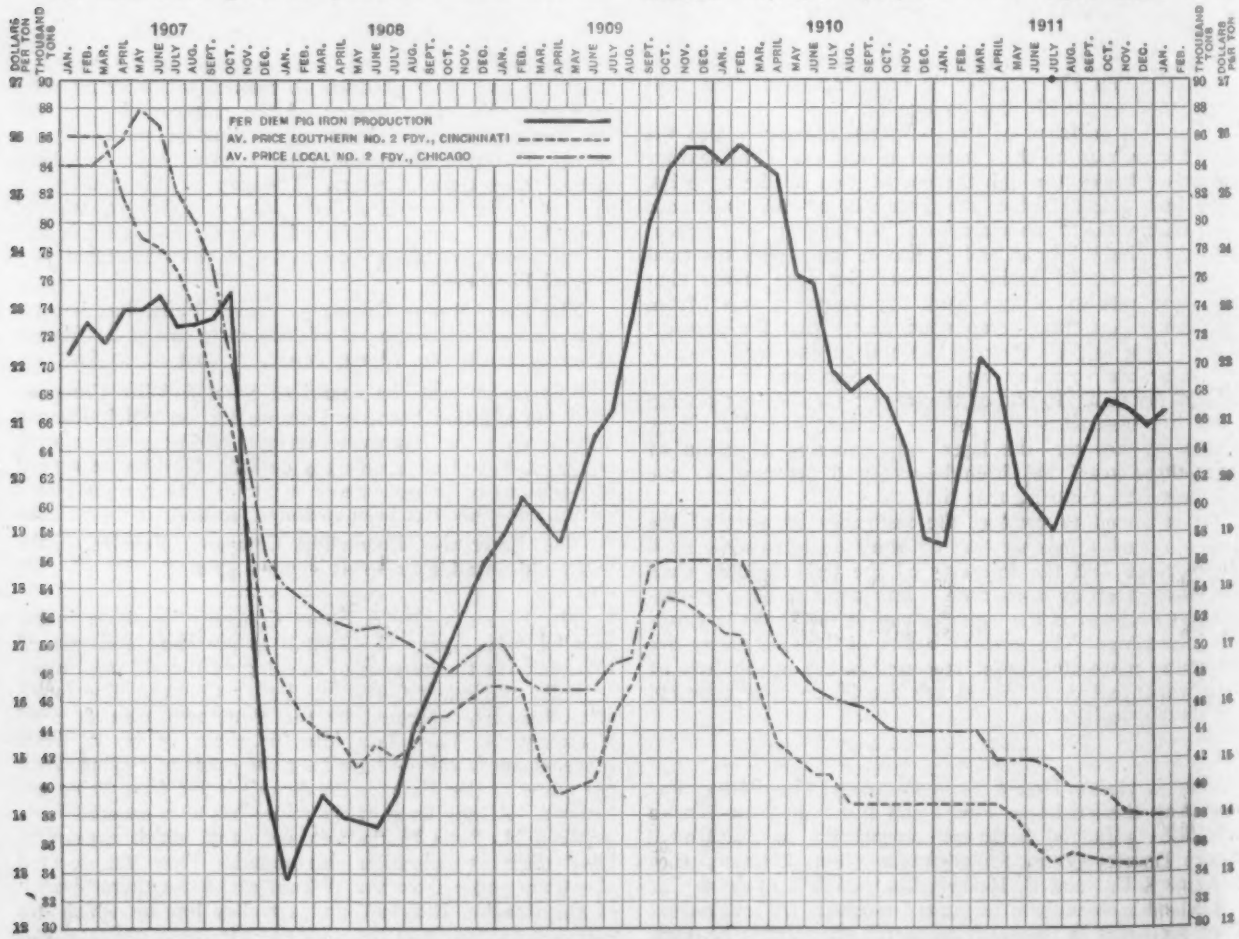


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to February 1, 1912; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Capacity in Blast February 1 and January 1

The following table shows the daily capacity of furnaces in blast February 1 and January 1:

Coke and Anthracite Furnaces in Blast.

Location of Furnaces.	Total number of stacks.	Feb. 1 Number in blast.	Feb. 1 Capacity per day.	Jan. 1 Number in blast.	Jan. 1 Capacity per day.
New York:					
Buffalo	17	10	3,441	10	3,480
Other New York	7	3	591	3	610
New Jersey	7	0	0	0	0
Pennsylvania:					
Lehigh Valley	22	9	2,104	10	2,260
Spiegel	3	1	100	1	100
Schuylkill Valley	16	9	2,310	8	2,205
Lower Susquehanna	7	2	522	2	526
Lebanon Valley	10	5	811	5	759
Pittsburgh District	49	40	17,432	35	15,142
Spiegel	4	4	610	3	480
Shenango Valley	20	13	4,128	11	3,609
Western Pennsylvania	27	15	3,765	15	3,715
Maryland	4	2	566	2	563
Wheeling District	14	11	4,015	9	3,373
Ohio:					
Mahoning Valley	24	18	7,240	19	7,613
Central and Northern	23	14	5,365	12	4,742
Hocking Val., Hanging Rock & S. W. Ohio	15	8	1,130	6	920
Illinois	31	20	8,165	19	8,250
Spiegel	2	2	135	2	155
Mich., Wis. and Minn.	10	6	1,366	5	1,218
Colorado, Mo. and Wash.	8	3	1,034	3	940
The South:					
Virginia	23	7	910	6	810
Kentucky	5	1	135	1	128
Alabama	46	18	4,520	20	5,222
Tenn. and Georgia	20	6	708	7	822
Total	414	227	71,103	214	67,642

Furnaces blown in in January include Carbon in the Lehigh Valley, Temple in the Schuylkill Valley, one Clairton, one Duquesne, three Edgar Thomson and one Monongahela in the Pittsburgh district; Sharon and one South Sharon in the Shenango Valley; Princess in Virginia; one La Belle and one Mingo in the Wheeling district; Franklin and Steelton at Columbus, and one National Tube Company at Lorain, in Ohio; Marting in the Hanging Rock district; one Gary in the Chicago district; Mayville B in Wisconsin, and one Sloss-Sheffield (No. 2 City) in Alabama.

Among furnaces blown out last month were one Lock Ridge and one Saucon in the Lehigh Valley; Grace in the Mahoning Valley (December 31); Upson in Northern Ohio; one Ironaton, one Vanderbilt and one Sloss-Sheffield in Alabama, and one Allen's Creek in Tennessee.

Chart of Pig Iron Production and Prices

The fluctuations in pig iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The two sets of figures are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.
January	71,149	33,918	57,975	84,148	56,752	66,384
February	73,038	37,163	60,976	85,616	64,090	.....
March	71,821	39,619	59,232	84,459	70,036	.....
April	73,885	38,289	57,962	82,792	68,836	.....
May	74,048	37,603	60,753	77,102	61,079	.....
June	74,486	36,444	64,656	75,516	59,585	.....
July	72,763	39,287	67,793	69,305	57,841	.....
August	72,594	43,851	72,546	67,963	62,150	.....
September	72,783	47,300	79,507	68,476	65,903	.....
October	75,386	50,554	83,856	67,520	67,811	.....
November	60,937	51,595	84,917	63,659	66,648	.....
December	39,815	56,158	85,022	57,349	65,912	.....

Monthly Average Prices in Dollars of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry at Chicago District Furnace Since January, 1907.

	1907.		1908.		1909.		1910.		1911.	
	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.	Sou. No.2, Cin.	Loc. No.2, Chi.
Jan.	26.00	25.00	16.15	18.10	16.26	17.00	17.25	18.50	14.25	15.00
Feb.	26.00	25.50	15.75	17.81	16.13	16.40	17.06	18.50	14.25	15.00
Mar.	26.00	25.75	15.50	17.50	15.05	16.15	16.30	17.80	14.25	15.00
Apr.	25.06	26.00	15.20	17.38	14.25	16.15	15.37	17.00	14.25	15.00
May	24.25	26.50	14.75	17.28	14.50	16.15	15.00	16.56	14.00	15.00
June	24.10	26.25	15.25	17.38	14.70	16.15	14.85	16.25	13.50	15.00
July	23.85	25.20	15.00	17.20	15.75	16.65	14.75	16.06	13.25	14.87
Aug.	23.00	24.50	15.25	17.00	16.38	16.78	14.31	16.00	13.45	14.50
Sept.	21.50	23.75	15.65	16.70	17.35	18.35	14.25	15.90	13.31	14.50
Oct.	20.95	22.10	15.75	16.50	17.88	18.50	14.25	15.56	13.25	14.46
Nov.	19.50	20.31	16.00	16.75	17.75	18.50	14.25	15.50	13.20	14.09
Dec.	17.00	18.55	16.25	17.00	17.45	18.50	14.25	15.50	13.19	14.00

Jan., 1912, 13.25, 14.00.

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.
Jan.	2,205,607	1,045,250	1,797,560	2,608,605	1,759,326	2,057,911
Feb.	2,045,068	1,077,740	1,707,340	2,397,254	1,794,509	.....
Mar.	2,226,457	1,228,204	1,832,194	2,617,949	2,171,111	.....
Apr.	2,216,558	1,149,602	1,738,877	2,483,763	2,064,086	.....
May	2,295,505	1,165,688	1,883,330	2,390,180	1,893,456	.....
June	2,234,575	1,092,131	1,930,866	2,265,478	1,787,566	.....
July	2,255,660	1,218,129	2,103,431	2,148,442	1,793,068	.....
Aug.	2,250,410	1,359,831	2,248,930	2,106,847	1,926,637	.....
Sept.	2,183,487	1,418,998	2,385,206	2,056,275	1,977,102	.....
Oct.	2,336,972	1,567,198	2,599,541	2,093,121	2,102,147	.....
Nov.	1,828,125	1,577,854	2,547,508	1,909,780	1,999,433	.....
Dec.	1,234,279	1,740,912	2,635,680	1,777,817	2,043,270	.....

Central Iron & Steel Company Receivership

The Central Iron & Steel Company, Harrisburg, Pa., was placed in the hands of receivers Tuesday, February 6, on petition of Henry Gilbert & Son of Harrisburg, creditors, and Mrs. Sarah G. McCauley, a stockholder. Charles L. Bailey, Jr., an attorney, and James M. Cameron, of Harrisburg, and J. V. W. Reynders of Steelton, Pa., vice-president of the Pennsylvania Steel Company, were appointed receivers. The order of the court gives the receivers authority to operate the plant and to purchase supplies, as well as to sell raw material, and it is believed that the plant will be kept in operation. The company has a capitalization of $2,180,000, most of the stock being held locally, and a bond issue of $1,239,000.

The Central Iron & Steel Company was formed in May, 1897, by the consolidation of the Central Iron Works, the Chesapeake Nail Works, the Paxton Rolling Mills, and the Paxton furnaces, all of Harrisburg. Its principal product is plates, its annual capacity being 210,000 tons. An open hearth plant was built in 1903-4, consisting of four 50-ton basic furnaces with an annual capacity of 100,000 tons. The company has operated the two Paxton blast furnaces, and in addition to producing basic pig iron for its own use has made some foundry iron for the market. It has an interest in the Mohawk iron mine on the Mesaba range and controls the Connellsville Basin Coke Company, which owns 2400 acres of coal lands in Monongalia County, W. Va. A description of the company's plant at Harrisburg was given in *The Iron Age* of January 4, 1906.

Edward Bailey is president of the company; James M. Cameron is vice-president; James B. Bailey, treasurer and general manager, and S. B. Boude, secretary.

Western Steel Corporation.—It is reported that the Metropolitan Trust Company of New York will finance a new company to take over the Western Steel Corporation which recently was put into receivers' hands. The proposal is that creditors receive 70 per cent. of their claims in new preferred and 30 per cent. in new common stock. The capitalization of the new company is put at $5,000,000 bonds, $3,000,000 preferred stock and $8,000,000 common stock. Of the $5,000,000 bond issue it is proposed to sell $2,000,000 to raise money to pay employees and to take care of other preferred claims.

The H. W. Johns-Manville Company, 100 William street, New York, already well known in the lighting field by reason of its J-M Linolite system of illumination, has acquired the sole selling agency for the entire products of I. P. Frink. The Frink reflectors and fixtures need no introduction to the lighting trade and consumers throughout the country, but this arrangement means that the H. W. Johns-Manville Company will be in position to design and sell lighting systems for every known form of artificial illumination. An engineering department will be maintained along extensive lines. This department will have a corps of engineers throughout the United States and Canada and be equipped to place data and recommendations in the hands of all interested in any subject pertaining to illumination.

The Woodward Iron Company is tearing down its small furnace at the Woodward plant, near Birmingham, Ala., and will build a new stack with a capacity of 350 to 400 tons a day.

The Iron and Metal Markets

Large Steel Corporation Gain

It Is Shown in Pig Iron Statistics

Some Easing in Prices of Finished Material—First Sale of Lake Ore

That the increased operation of steel works, due to the large business booked in December, has centered in the Steel Corporation's plants in the Pittsburgh district is strikingly shown in the pig iron statistics for January. In that month 13 Steel Corporation furnaces were blown in. That is also exactly the number by which the total of active furnaces in the entire country on February 1 exceeds that of January 1—227 against 214.

Pig iron production in January was 2,057,911 gross tons, or 66,384 tons a day, as against 2,043,270 tons in December, or 65,912 tons a day. Severe weather cut down the output of a good many furnaces. February promises a considerable increase, however. While 8 furnaces were blown out last month, 21 were blown in, and the capacity active February 1 was 71,103 tons a day, a gain of nearly 3500 tons upon January 1. Production is now at the rate of 26,000,000 tons a year, or 1,250,000 tons a year more than on January 1. In 1911 the total for the country was 23,650,000 tons.

The Steel Corporation now has 86 per cent. of its blast furnace capacity in operation. It has blown in five furnaces since February 1—two at Cleveland, one Isabella at Pittsburgh, and one South Chicago and one Joliet in Illinois—making a total of 18 furnaces it has blown in this year. The Bessemer blooming mill of the American Steel & Wire Company at Newburgh, Ohio, has been started up for the first time in four years.

Estimates of the unfilled tonnage of the corporation on January 31, for which the figures will be published February 10, point to an increase exceeding 250,000 tons.

It should be said that this scale of activity at Steel Corporation plants is not shared by the independent steel companies generally. One or two of such companies are running fuller than in the late weeks of 1911; others have made little changes in their running schedules since January 1.

The receivership of a central Pennsylvania steel company is an unpleasant reminder of the deep inroads on profits made by the pace of recent months. Nor is there indication of any early easing of the strain on the whole industry.

In the finished lines of largest tonnage there is some irregularity in quotations, the prices at which large producers were holding plates, shapes and bars in December having been shaded in some cases.

Eastern plate mills are counting on considerable business from the vessels now in prospect for seaboard ship-yards, including four for the Southern Pacific Railroad, each of which will require about 10,000 tons of steel. Upward of 75,000 tons of plates and shapes will be needed for all the work likely to be placed.

The largest rail orders having been placed, it has been assumed in some recent comments that a decided lull will follow; but February and March in other years have yielded respectable totals. The Great Northern has increased its order from 36,000 to 60,000 tons, a large part of the addition going to Buffalo. The Ontario & Western has placed 3000 tons in eastern Pennsylvania. Considerable export business is pending. Frog and crossing works have been good buyers.

Very heavy demands are being made by sheet and tinplate mills in the Central West on the steel plants which supply their raw material. More than one additional consolidation of Central Western interests is under negotiation, tying up sheet and tinplate producers to open-hearth steel plants.

The pig iron market is drifting, with little definite development. The year has now advanced far enough to show whether a buying movement is ahead that will lift values out of the rut, but no real encouragement can be found in the situation as it stands. Southern producers of foundry iron show a firmer front, it is true, but their Northern competitors have not shared it as yet.

Further sales of iron to pipe foundries are reported, including 10,000 tons to one Eastern plant and a round lot to another, while a Virginia pipe foundry took 3000 tons. Demand for cast-iron pipe is large and well distributed, but as in steel lines, there is much more satisfaction in the tonnage than in prices.

At Cleveland a sale of 50,000 tons of ore for 1912 is reported, the non-Bessemer portion of it at a considerable concession from the $3.70 quotation announced at the opening of last season.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Feb. 7, 1912.	Jan. 31 1912.	Jan. 3, 1912.	Feb. 8, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2 standard, Philadelphia	$14.85	$14.85	$14.85	$15.50
Foundry No. 2, Valley furnace	13.00	13.00	13.00	13.75
Foundry No. 2 Southern, Cincinnati	13.25	13.25	13.25	14.25
Foundry No. 2, Birmingham, Ala.	10.00	10.00	10.00	11.00
Foundry No. 2, at furnace, Chicago*	14.00	14.00	14.00	15.50
Basic, delivered, eastern Pa.	14.25	14.25	14.25	14.50
Basic, Valley furnace	12.25	12.25	12.25	13.75
Bessemer, Pittsburgh	14.90	14.90	15.15	15.90
Gray forge, Pittsburgh	13.40	13.40	13.40	14.15
Lake Superior charcoal, Chicago	16.00	16.00	16.00	17.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	20.00	20.00	20.00	23.00
Open hearth billets, Pittsburgh	20.00	20.00	20.00	23.00
Forging billets, Pittsburgh	28.00	28.00	27.00	28.00
Open hearth billets, Philadelphia	22.40	22.40	22.40	25.40
Wire rods, Pittsburgh	25.00	25.00	24.50	29.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	15.00	15.00	14.75	14.50
Iron rails, Philadelphia	16.00	16.00	16.00	17.00
Car wheels, Chicago	*13.00*	13.25	13.25	13.00
Car wheels, Philadelphia	12.00	12.00	12.50	13.00
Heavy steel scrap, Pittsburgh	*12.25*	12.50	12.50	13.75
Heavy steel scrap, Chicago	10.50	10.50	10.50	11.50
Heavy steel scrap, Philadelphia	**11.75**	11.50	12.25	13.00
Finished Iron and Steel, Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.27½	1.27½	1.27½	1.29
Iron bars, Pittsburgh	1.25	1.25	1.25	1.35
Iron bars, Chicago	1.15	1.15	1.15	1.30
Steel bars, Pittsburgh	1.15	1.15	1.15	1.40
Steel bars, tidewater, New York	1.31	1.31	1.31	1.56
Tank plates, Pittsburgh	*1.12½*	1.15	1.15	1.40
Tank plates, tidewater, New York	*1.28½*	1.31	1.31	1.56
Beams, Pittsburgh	*1.12½*	1.15	1.15	1.40
Beams, tidewater, New York	*1.28½*	1.31	1.31	1.56
Angles, Pittsburgh	*1.12½*	1.15	1.15	1.40
Angles, tidewater, New York	*1.28½*	1.31	1.31	1.56
Skelp, grooved steel, Pittsburgh	1.12½	1.12½	1.15	1.30
Skelp, sheared steel, Pittsburgh	1.20	1.20	1.20	1.35

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Pound to Largest Buyers:	Feb. 7, 1912. Cents.	Jan. 31, 1912. Cents.	Jan. 3, 1912. Cents.	Feb. 8, 1911. Cents.
Sheets, black, No. 28, Pittsburgh	1.90	1.90	1.90	2.20
Wire nails, Pittsburgh	1.60	1.60	1.55	1.75
Cut nails, Pittsburgh	1.55	1.55	1.50	1.60
Fence Wire, ann'led, 0 to 9, P'gh.	1.40	1.40	1.35	1.55
Barb wire, galv., Pittsburgh	1.90	1.90	1.85	2.05
Coke, Connellsville, Per Net Ton, at Oven:				
Furnace coke, prompt shipment.	$1.80	$1.75	$1.85	$1.40
Furnace coke, future delivery..	1.80	1.75	1.65	1.60
Foundry coke, prompt shipment.	2.00	2.00	2.00	2.00
Foundry coke, future delivery..	2.10	2.10	2.15	2.25
Metals, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	*14.25*	14.50	14.25	12.75
Electrolytic copper, New York..	*14.00*	14.25	14.12½	12.37½
Spelter, St. Louis	6.40	6.40	6.20	5.30
Spelter, New York	6.55	6.55	6.35	5.50
Lead, St. Louis	*3.90*	4.17½	4.35	4.30
Lead, New York	*4.00*	4.25	4.45	4.45
Tin, New York	44.00	43.75	44.25	40.12½
Antimony, Hallett, New York..	*7.50*	7.55	7.60	7.75
Tin plate, 100-lb. box, New York	$3.64	$3.64	$3.64	$3.94

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 12½c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in. on one or both legs, ¼ in. and over, 1.12½c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.	1.20 to 1.25
H-beams over 18 in.	1.30 to 1.35
Angles over 6 in.	1.20 to 1.25
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909	1.20 to 1.25
Tees, 3 in. and up	1.20 to 1.25
Zees, 3 in. and up	1.15 to 1.20
Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909.	1.20 to 1.25
Deck beams and bulb angles	1.45 to 1.50
Hand rail tees	2.00 to 2.15
Checkered and corrugated plates	2.00 to 2.15

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.30 to 1.35
Nos. 9 and 10	1.40 to 1.45
Nos. 11 and 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.60 to 1.65

Box Annealed Sheets, Cold Rolled.

	One Pass.	Three Pass.
Nos. 10 to 12	1.55 to 1.60	.....
Nos. 13 and 14	1.60 to 1.65	.....
Nos. 15 and 16	1.65 to 1.70	1.75 to 1.80
Nos. 17 to 21	1.70 to 1.75	1.80 to 1.85
Nos. 22, 23 and 24	1.75 to 1.80	1.85 to 1.90
Nos. 25 and 26	1.80 to 1.85	1.90 to 1.95
No. 27	1.85 to 1.90	1.95 to 2.00
No. 28	1.90 to 1.95	2.00 to 2.05
No. 29	1.95 to 2.00	2.05 to 2.10
No. 30	2.05 to 2.10	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	1.90 to 1.95
Nos. 12, 13 and 14	2.00 to 2.05
Nos. 15, 16 and 17	2.15 to 2.20
Nos. 18 to 22	2.30 to 2.35
Nos. 23 and 24	2.40 to 2.45
Nos. 25 and 26	2.60 to 2.65
No. 27	2.75 to 2.80
No. 28	2.90 to 2.95
No. 29	3.00 to 3.05
No. 30	3.20 to 3.25

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Corrugated Roofing Sheets Per Square.

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	....	$2.25	23	$2.30	$3.40
28	$1.35	2.50	22	2.45	3.55
27	1.45	2.55	21	2.65	3.90
26	1.55	2.60	20	2.90	4.20
25	1.75	2.95	18	3.85	5.45
24	2.00	3.05	16	4.60	6.30

Wire Rods and Wire.—Bessemer, open earth and chain rods, $25. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.40; galvanized, $1.70. Carload lots, to retailers, annealed, $1.50; galvanized, $1.80. Galvanized barb wire to jobbers, $1.90; painted, $1.60. Wire nails, to jobbers, $1.60.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, Per 100 Lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.55	$1.60	$1.65	$1.70	$1.80	$1.90	$2.00	$2.10
Galvanized	1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from December 1, 1911:

Butt Weld.

	Steel Black.	Steel Galv.	Iron Black.	Iron Galv.
⅛ and ¼ in.	74	54	68	48
⅜ in.	75	65	69	59
½ in.	78	68	72	62
¾ to 1½ in.	81	73	75	67
2 to 3 in.	82	75	76	69

Lap Weld.

1¼ and 1½ in.	..	..	62	61
2 in.	79	72	72	65
2½ to 4 in.	81	74	74	67
4½ to 6 in.	80	72	73	65
7 to 12 in.	78	68	71	61
13 to 15 in.	55	..	47	..

Butt Weld, extra strong, plain ends, card weight.

⅛, ¼, ⅜ in.	70	60	65	55
½ in.	75	69	70	64
¾ to 1½ in.	79	73	74	68
2 to 3 in.	80	74	75	69

Lap Weld, extra strong, plain ends, card weight.

1½ in.	..	..	66	60
2 in.	76	70	71	65
2½ to 4 in.	78	72	73	67
4½ to 6 in.	77	71	72	66
7 to 8 in.	70	60	65	55
9 to 12 in.	65	55	60	50

Butt Weld, double extra strong, plain ends, card weight.

½ in.	65	59	60	54
¾ to 1½ in.	68	62	63	57
2 to 3 in.	70	64	65	59

Lap Weld, double extra strong, plain ends, card weight.

2 in.	66	60	61	55
2½ to 4 in.	68	62	63	57
4½ to 6 in.	67	61	62	56
7 to 8 in.	60	50	55	45

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld
2, 2½ to 4 in. Lap Weld

} Will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld as specified.

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Standard Charcoal Iron.*	
1¼ to 2¼ in.	65	1½ in.	48
2½ in.	67½	1¾ to 2¼ in.	50
2¾ to 3¼ in.	72½	2½ in.	55
3½ to 4 in.	75	2¾ to 5 in.	60
5 to 6 in.	67½	Locomotive and steamship special grades bring higher prices.	
7 to 13 in.	65		

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f. o. b. mill at Pittsburgh basing discounts, lowered by two points.

Pittsburgh

PITTSBURGH, PA., February 6, 1912.

Much of the increased activity is confined to a very few of the most important steel interests, it being evident that they took a large share of the heavy contracts for finished iron and steel placed late in 1911. The Carnegie Steel Company, which is operating 50 of its 59 blast furnaces, will probably start one or two more in the near future. The Jones & Laughlin Steel Company has started up the fourth Talbot open-hearth furnace at Aliquippa. Specifications against contracts so far this month have shown a falling off as compared with January, and several steel makers state that shipments are now ahead of specifications, being a direct reversal of conditions existing a month or so ago. This lull in specifications is causing some uneasiness. New demand is also dull, but this was to be expected in view of the heavy business placed in December. There is a softer tone to prices, and on desirable orders plates, plain structural material and steel bars are being offered at 1.10c., Pittsburgh, the ordinary market being 1.15c. Prices on black sheets are also weaker, No. 28 having been offered recently at 1.85c., at mill. The indications are that the crest of the wave has been reached as regards prices, and unless there is soon some improvement in specifications and new demand there may be lower values. The pig iron market is extremely quiet, this being the weakest point in the whole situation, as consumers are withholding orders in the belief that prices may be lower on account of the probability of reduced freight rates and lower ore prices. The scrap trade is dull and prices have sagged. Coke is about holding its own, but the supply of furnace coke for prompt shipment is considerably heavier. The most active feature of the market is specifications against contracts for billets and sheet bars, the Carnegie Steel Company being considerably behind in deliveries. A leading tin plate interest had a number of mills closed down last week waiting for bars.

Pig Iron.—Inquiries are only for small lots to cover actual needs. The average price of Bessemer iron in January was $14.07 and basic $12.37, at Valley furnace. Sales are reported of 200 tons of Bessemer iron to a local consumer for February delivery at $14; 1200 tons of gray forge for February-April at $12.50, and 200 tons of No. 2 foundry at $13, all at Valley furnace. We quote: Bessemer, $14; basic, $12.25; malleable Bessemer, $12.75 to $13; No. 2 foundry, $13; gray forge, $12.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel Billets and Sheet Bars.—The Carnegie Steel Company has been out of the market for several weeks as an actual seller of billets, sheets and tin bars, and is behind in deliveries. Its Sharon open hearth plant has been started up, and on Tuesday its Bessemer works at Columbus was started. The Columbus plant makes about 15,000 tons of ingots per month and the output will be billets and sheet bars. While $20, Pittsburgh, is being quoted on Bessemer and open hearth billets it is stated that one or two of the smaller makers would shade this price about 50c. a ton on open hearth steel. We quote: Bessemer and open hearth billets, 4 x 4 in., up to 0.25 carbon, $20; Bessemer and open hearth sheet and tin plate bars, $21; forging billets, $28, all at Pittsburgh. Prices of billets and sheet bars at Youngstown are 50c. under Pittsburgh and on very desirable orders $1 under might be done.

Ferromanganese.—An inquiry is in the market for 200 tons for shipment over four months, commencing in March. The price of $41, Baltimore, is reported as being firmly held on small lots, but some resales have been made at about 50c. a ton less. The freight rate to Pittsburgh is $1.95 a ton.

Ferrosilicon.—The inquiry is only for small lots, important consumers being well covered. Prices on the lower grades, which have been more or less shaded for some time, are reported as being a trifle stronger. We quote 50 per cent. in small lots at $70; 100 to 500-ton lots at $69, and over 500 tons at $68, Pittsburgh, but these prices are weak. On the lower grades we quote 10 per cent., $20; 11 per cent., $21, and 12 per cent., $22, f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio.

Muck Bar.—The local market is quiet. In fact, little muck bar is sold at any time in this district, most consumers rolling their own. A pipe mill outside the city is reported to have bought about 300 tons on the basis of $28, Pittsburgh, and we quote best grades made from all pig iron at this price.

Wire Rods.—New inquiry is light and only for small lots, all large consumers being covered by contracts on which prices are adjusted from month to month. On small lots of Bessemer, open-hearth and chain rods $25, Pittsburgh, is being quoted, but on a desirable order this price would likely be shaded.

Skelp.—A sale of 1000 tons of narrow grooved steel plates is reported on the basis of about 1.10c., Pittsburgh. The general market on skelp is quiet. We quote grooved steel skelp at 1.12½c.; sheared steel skelp, 1.20c.; grooved iron skelp, 1.42c. to 1.45c., and sheared iron skelp, 1.62½c. to 1.65c., all for delivery at buyers' mills in the Pittsburgh district.

Steel Rails.—The order of the Pittsburgh & Lake Erie Railroad for 6400 tons of standard sections, referred to in this report last week, has been definitely placed with the Carnegie Steel Company, and deliveries will be made in the early spring. This company will also furnish the splice bars, about 500 tons. The new demand for light rails is reported to be quite active, new orders and specifications received last week by the Carnegie Steel Company having been the heaviest for some time. This company has received an order for 8000 car wheels for cars to be built by the Pennsylvania Railroad and for 4800 wheels for the Pennsylvania Lines West, and will also furnish the wheels for the 1500 cars to be placed shortly by the Bessemer & Lake Erie Railroad. A good deal of tonnage in splice bars will soon be placed. We quote splice bars at 1.50c. per lb., and repeat quotations on rails: Standard sections, 1.25c. per lb.; 8 and 10-lb. light rails, 1.25c.; 12 and 14-lb., 1.16c.; 16, 20 and 25-lb., 1.12c.; 30 and 35-lb., 1.10c., and 40 and 45-lb., 1.08c., f.o.b. at mill.

Structural Material.—Local fabricators report that new inquiries have quieted down. The McClintic-Marshall Construction Company has taken 700 tons for a new warehouse for the Frick & Lindsay Company, North Side, Pittsburgh, and the Ft. Pitt Bridge Works has taken about 1000 tons for bridge work for the Missouri, Oklahoma & Gulf Railroad. The Riverside Bridge Company, Martins Ferry, Ohio, has taken about 400 tons for a building at Decatur, Ind. The Carnegie Steel Company is now making deliveries on the 38,000 tons of material for the main span of the Hell Gate Bridge, New York, taken some time ago by the American Bridge Company, and has a provisional contract with the McClintic-Marshall Construction Company, by which it will roll the 40,000 tons taken by that company for the approaches and terminals of the same structure. Competition on work now coming up is keener, and prices on plain material are weaker. We quote beams and channels up to 15 in. at 1.12½c. to 1.15c. for desirable orders, while on very small lots 1.20c. is being quoted. Prices depend largely on the quantity involved and deliveries wanted.

Plates.—New car orders are not large, and inquiries are few. The Pennsylvania Railroad has placed contracts for 180 steel passenger cars, of which 50 went to the Standard Steel Car Company, 65 to the Pressed Steel Car Company and 65 to the American Car & Foundry Company. The Grand Trunk has ordered 250 automobile cars from the Western Car & Foundry Company and the same number from the American Car & Foundry Company. The Western Maryland has inquiries out for 1000 box cars, 1000 composite gondolas and 750 hoppers. The Bessemer & Lake Erie Railroad is in the market for 1000 gondolas and 500 steel underframe box cars; the Northern Pacific for 1500 to 2000 steel underframe box cars, and the Rock Island for 750 gondolas. The general demand for plates from boiler shops and other consumers is quiet, but the larger plate mills are fairly well filled for the next three or four months. Prices seem to be somewhat easier, and we quote ¼-in. and heavier plates at 1.12½c. to 1.15c. on desirable orders, while on smaller lots 1.20c. is quoted.

Sheets.—Not much new business is offering, as nearly all consumers covered early in December for some time ahead. Specifications against contracts continue to come in at a heavy rate, the American Sheet &

Tin Plate Company reporting that its specifications in January were larger than in any January since its organization. Other leading makers of sheets also report specifications heavy, and the mills are now operating very close to 85 per cent. of capacity. Prices are fairly strong, but on desirable orders 1.85c. on No. 28 black is being named by a few mills. The full schedule of prices on black, galvanized and roofing sheets is given on a previous page.

Tin Plate.—Specifications against the large contracts placed some time ago are coming in reasonably well, but are not so heavy as some time ago. February is always a dull month in the tin plate trade, and this month is no exception. Several mills are having trouble in getting prompt deliveries of tin bars, and last week one leading interest had a number of mills down waiting for bars. The Jones & Laughlin Steel Company is now operating 24 hot tin mills at Aliquippa, and reports enough business booked, if specifications come in, to run these mills to July 1. As a whole, the tin plate industry is operating at present to about 82 per cent. of capacity, with a few running as high as 90 per cent. We quote tin plate in small lots at $3.40 per base box for 14 x 20 coke plates, but on desirable orders $3.30 is being named.

Iron and Steel Bars.—A relatively small amount of new business has been placed since January 1, but this is because large consumers covered late in 1911, when prices were at their lowest. Specifications against these contracts are coming in quite well. The leading steel bar mills will be able to run pretty full for the next two or three months, providing specifications come in. The market on steel bars seems to be slightly easier, and reports are that one or two mills are offering them at 1.10c. for desirable orders. The new demand for iron bars is quiet, and specifications are not heavy. We continue to quote steel bars at 1.15c. and iron bars at 1.25c. at makers' mills for delivery in the first quarter.

Hoops and Bands.—Only a small amount of new business is being placed and specifications against contracts are not coming in so freely. We quote steel bands at 1.15c., with extras as per the steel bar card, and hoops at 1.25c. base f.o.b., Pittsburgh.

Rivets.—New orders are not plentiful and mostly for small lots, but railroads and other large consumers are specifying quite freely against contracts. We quote structural rivets at 1.50c. and boiler rivets at 1.60c., f.o.b. Pittsburgh. On very desirable orders these prices would be shaded about 5 cents per 100 lb.

Railroad Spikes.—Three or four of the leading railroads, among them the Pennsylvania, which recently placed large contracts for rails, are reported in the market for a large tonnage of railroad spikes. A local maker reports sales of 8000 to 10,000 kegs on the basis of about $1.40 per 100 lb., Pittsburgh. Other contracts for delivery through the first half have been placed at this price. We quote base sizes at $1.40 in carload and larger lots and $1.45 in small lots per 100 lb., f. o. b. Pittsburgh.

Merchant Steel.—A moderate amount of new business is being placed, mostly in small lots. Nearly all consumers were covered some time ago for a considerable period ahead and specifications against these contracts are only fair. Regular prices, which are more or less shaded on desirable orders, are as follows: Iron finished tire, 1½ x ⅜-in. and larger, 1.15c., base; planished tire, ⅛-in. and larger, 1.35c.; channel tire, ¾, ⅞ and 1-in., 1.65c.; toe calk, 1.70c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.55c.; cutter shoe tapered or bent, 2.15c.; spring steel, 1.75c.; machinery steel, smooth finish, 1.50c., all f.o.b. at mill.

Spelter.—The demand for spelter is a little better, and prices are a shade firmer. Considerable difference is observed in prices now being quoted on spot and futures, spot being offered as low as 6.15c., while as high as 6.40c. is quoted on futures. The rate from East St. Louis to Pittsburgh is 12½c. per 100 lb.

Wire Products.—Little new business is being placed in wire or wire nails, nearly all consumers having covered ahead for a considerable period when prices were lower. Specifications against these contracts are coming in at a fairly satisfactory rate. We quote wire nails, $1.60.; cut nails, $1.55; galvanized barb wire, $1.90; painted, $1.60; annealed fence wire, $1.40, and galvanized fence wire, $1.70, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Pipe.—About the only large inquiry in the market for line pipe is that of the Logan Natural Gas Company, of this city, which put out an inquiry last week for 40 miles of 12-in., but advices now are that it may buy 80 miles. The Philadelphia Company, of this city, which is in the market for about 7000 tons of iron pipe and casing, may divide the order among local mills and an Eastern mill. The volume of new business in merchant pipe keeps up very well for this season. It is stated that discounts on iron and steel pipe are fairly well held.

Tubes.—Specifications from railroads on contracts for boiler tubes placed in November and December are coming in well, but very little new business is now being placed. The demand for merchant tubes is dull and prices are still being heavily shaded.

Iron and Steel Scrap.—A decided lull in new buying is observed in the scrap trade. With more material being offered by dealers prices have sagged to some extent. The Jones & Laughlin Steel Company is still a buyer of heavy steel scrap of special grade at about $12.75, delivered at its South Side mills. The Pennsylvania Railroad list, on which bids close this week, is quite heavy, showing about 18,000 tons. Dealers quote as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$12.25 to $12.50
No. 1 foundry cast	12.50 to 12.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district	10.75 to 11.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.50 to 12.75
No. 1 railroad malleable stock	11.25 to 11.50
Grate bars	9.00 to 9.25
Low phosphorus melting stock	15.25 to 15.50
Iron car axles	20.50 to 21.00
Steel car axles	16.00 to 16.25
Locomotive axles	22.00 to 22.50
No. 1 busheling scrap	11.00 to 11.25
No. 2 busheling scrap	7.00 to 7.25
Old car wheels	12.00 to 12.25
*Cast iron borings	9.65
*Machine shop turnings	9.75
†Sheet bar crop ends	13.75 to 14.00
Old iron rails	14.50 to 14.75
No. 1 wrought scrap	12.00 to 12.25
Heavy steel axle turnings	9.75 to 10.00
Stove plate	9.00 to 9.25

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
‡Shipping point.

Coke.—The coke regions are suffering from the handicap of extremely cold weather and lack of sufficient labor to run some of the plants full. There is still some scarcity of prompt furnace coke, but the supply is gradually getting larger. The output in the Upper and Lower Connellsville regions last week was 400,597 tons, a decrease over the previous week of 6588 tons. We quote standard grades of furnace coke at $1.75 to $1.80 and 72-hr. foundry for prompt shipment at $2 to $2.10 per net ton at oven.

Chicago

CHICAGO, ILL., February 6, 1912.

The record of January from the standpoint of tonnage was strongly upheld by the liberal specifications on contracts. The sales record was not so promising, new business having shrunk noticeably from the December rush. Little increase in the general volume emanating from new contracts is anticipated until the end of the first quarter approaches. A more cheerful aspect has been given to the rail situation by those who see in the contracts already placed only a covering of immediate requirements. This is borne out by the very general specification of prompt shipment of the entire tonnages ordered, and further buying is expected at a later period. Continued buying of equipment by the railroads is confidently expected. The sanctioning of the purchase of track and rolling stock equipment by the Wabash Railroad to the amount of over $8,000,000, and the issuance of equipment bonds to the amount of $10,000,000 by two other Western roads are noted as encouraging features. Car and locomotive orders have not been prominent the past week, although a number of small orders are reported. A decided improvement in bar iron tonnage is shown, and rolling mill operations in this territory are appreciably increased. The market for old materials is weaker and transactions are very limited. In general, the market lacks animation and, while prices continue as they have been during the past few weeks, conditions offer little to support them.

Pig Iron.—A number of the Southern interests have placed their price for No. 2 foundry at Birmingham on the basis of $10.50, to which price a firm adherence is being maintained. Other interests, however, are continuing to offer $10 iron. The interest in Southern iron is, however, at a low ebb and one inquiry for 1500 tons is the only prospective sale of importance. The

demand for Northern iron is more active and a number of sales and inquiries of desirable tonnage are reported. In the matter of price the position of local furnaces is in decided contrast to those of the South and fluctuations in regular quotations are not lacking. A keenly competitive situation exists and for standard No. 2 iron better than $14, f.o.b. furnace, is difficult to obtain. We continue to quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices on prompt shipments:

Lake Superior charcoal	$16.00 to $16.50
Northern coke foundry, No. 1	14.50
Northern coke foundry, No. 2	14.00
Northern coke foundry, No. 3	13.50 to 14.00
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	14.85
Southern coke, No. 2 foundry and No. 2 soft	14.35 to 14.85
Southern coke, No. 3	14.10 to 14.35
Southern coke, No. 4	13.85 to 14.10
Southern gray forge	13.60 to 13.85
Southern mottled	13.60 to 13.85
Malleable Bessemer	14.35 to 14.50
Standard Bessemer	16.75
Basic	14.75
Jackson County and Kentucky silvery, 6 per cent	16.40
Jackson County and Kentucky silvery, 8 per cent	17.40
Jackson County and Kentucky silvery, 10 per cent	18.40

Rails and Track Supplies.—Makers of frogs and switches are reported as having placed orders with local mills for rails aggregating 12,000 tons. Few additional requirements are noted. It has been pointed out with regard to the orders for rails placed thus far in this territory that shipment of the local tonnage is specified within 60 days in most instances. The same is true of orders for track fastenings. This and other indications are believed to signify that railroads are not now attempting to provide for their requirements through the year. Neither of the local rail mills is in operation as yet and the date at which they will be started has not yet been determined. We quote standard railroad spikes at 1.50c., base; track bolts, with square nuts, 1.90c., base, all in carload lots, Chicago; standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c., Chicago

Structural Material.—The fact that the bulk of structural tonnage booked by the mills for rolling in this quarter has been in sizes suitable for car construction has contributed to a distribution of orders among the several mills well proportioned to their respective capacities. New orders for cars include 500 steel underframes for Swift & Co., Chicago, to be built by the Whipple Car Company. Orders for bridge steel from the Oregon Electric Railway, awarding 2350 tons to the Pennsylvania Steel Company, and from the Missouri, Oklahoma & Gulf for three girder spans, dividing 1429 tons between the Fort Pitt Bridge Works and the Wisconsin Bridge Company, are reported. The most important architectural contracts for fabricated steel are 4768 tons for the Monward Realty Company, Bank Building, St. Louis, let to James Stewart & Co., and 1060 tons for an office building for the James Black Masonry & Contracting Company to be furnished by the American Bridge Company. Other awards totaling 2428 tons include 157 tons for the State Reformatory at Monroe, Wash., to the Hofius Steel & Equipment Company; 120 tons for the post office at Bismarck, N. D.; 370 tons for the Larkin Company warehouse, Chicago, to the Leonard Construction Company.; 325 tons for a hotel building at San Francisco to the Pacific Rolling Mill Company; 241 tons for the Hygienic Ice Company, Chicago, to the Kenwood Bridge Company; 169 tons for the Muskogee Electric Traction Company, Muskogee, Okla., car barns; 178 tons for the Henderson office building, Duluth, to the American Bridge Company; 290 tons for two tanks for the Union Oil Company, San Francisco, to the Petroleum Iron Works Company; 285 tons for the Albany Hotel, Denver, to Lowith Bros. Iron Works; 179 tons for the Kansas Milling Company, Wichita, and 114 tons for the Charles Pillsbury residence, Minneapolis, to the Minneapolis Steel & Machinery Company. The placing of the order for the 3000 tons of steel to be fabricated for the Kesner Building, Chicago, by the Hansell-Elcock Company, is looked upon as a possible forerunner of the contracts for several other steel buildings for which permits have already been taken out in Chicago. For plain structural shapes we continue to quote for mill shipment, Chicago delivery, 1.30c. to 1.38c. and from store, 1.60c.

Plates.—A number of small orders for all-steel passenger equipment and an order for 50 tank cars for the Northern Pacific are among the new railroad purchases requiring additional steel plate tonnage. Specifications continue liberal and the general market situation as regards this department of finished material is without particular change. We quote for Chicago delivery, mill shipment, 1.30c. to 1.40c., and from store, 1.60c.

Sheets.—While little opportunity is offered to better the situation in the matter of prices on sheets the evidence points to a considerable degree of firmness at the minimum quotation. Tonnage holds up fairly well, but the lack of impetus which seems to characterize the market in general at this time is also apparent among the users of sheets. We quote Chicago prices as follows: Carload lots, from mill, No. 28 black sheets, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.; No. 10 blue annealed, 1.53c. to 1.58c. Prices from store, Chicago, are: No. 10, 1.90c.; No. 12, 1.95c.; No. 28 black, 2.30c.; No. 28 galvanized, 3.35c.

Bars.—A decided improvement in the tonnage of bar iron secured by the various mills of this district has firmly established 1.15c., Chicago, as the minimum quotation, while some business is being taken at prices 50c. above this figure. The Blue Island Rolling Mill, which has been idle for an extended period, is now in operation. Steel bar business continues without change from conditions reported a week ago. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.25c. to 1.33c.; bar iron, 1.15c. to 1.20c.; hard steel bars, rolled from old rails, 1.15c. to 1.20c. From store: Soft steel bars, 1.50c. to 1.55c., Chicago.

Wire Products.—Under the spur of the recent advance in price specifications covering wire and nails have aggregated a very satisfactory tonnage in the past month. The resumption of building operations has augmented the demand for wire nails, and improvement is also noted in the buying of barb wire by merchants for spring sales. We continue to quote as follows: Plain wire, No. 9 and coarser, base, $1.58; wire nails, $1.78; painted barb wire, $1.78 to $1.83; galvanized, $2.08; polished staples, $1.83; galvanized, $2.13, all Chicago.

Cast Iron Pipe.—Bids on 25,000 tons of pipe at Chicago were opened February 6. Of the tonnage awarded at St. Paul last week the United States Cast Iron Pipe & Foundry Company was the successful bidder for 4500 tons of 24, 30 and 36-in., while 1300 tons of 6 to 16-in. will be furnished by the Lynchburg Foundry Company. The American Cast Iron Pipe Company, Birmingham, will supply 600 tons for Council Bluffs, Ia. The leading interest also took 2000 tons awarded at Indianapolis. A letting involving 1200 tons is scheduled for February 8 at Duluth. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $27; 6 to 12-in., $25; 16-in. and up, $24.50, with $1 extra for gas pipe.

Old Material.—With an exceedingly light demand from melters the local scrap market is sagging under its own weight and prices are generally 25c. a ton lower than quoted a week ago. While melters are operating with comparatively small stocks of scrap on their yards their recent purchases, which are now being delivered, are reported sufficient to make heavy buying at this time unnecessary, despite the general improvement in mill operations. Probably as a result of the extremely cold weather railroad offerings of scrap are also light. The Wabash Railroad is asking bids on about 500 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$15.00 to $15.50
Old steel rails, rerolling	12.50 to 13.00
Old steel rails, less than 3 ft	11.75 to 12.25
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	10.50 to 11.00
Frogs, switches and guards, cut apart	10.50 to 11.00
Shoveling steel	10.00 to 10.50
Steel axle turnings	8.50 to 9.00

Per Net Ton.

Iron angles and splice bars	$12.50 to $13.00
Iron arch bars and transoms	13.50 to 14.00
Steel angle bars	10.00 to 10.50
Iron car axles	17.75 to 18.25
Steel car axles	15.50 to 16.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	10.00 to 10.50
Steel springs	10.50 to 11.00
Locomotive tires, smooth	12.75 to 13.25
Machine shop turnings	6.50 to 7.00
Cast and mixed borings	6.25 to 6.75
No. 1 busheling	8.75 to 9.00
No. 2 busheling	6.25 to 6.75
No. 1 boilers, cut to sheets and rings	7.00 to 7.50
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	11.00 to 11.50
Stove plate and light cast scrap	9.25 to 9.75
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.00 to 9.50
Pipes and flues	8.00 to 8.50

Philadelphia

PHILADELPHIA, PA., February 6, 1912.

While negotiations are still pending for large quantities of plates and shapes for shipbuilding, and encouraging indications in connection with some of the larger building projects in this vicinity are noted, business coming from other branches of the trade moves slowly. Eastern mills are getting a slightly larger share of the orders coming out, but so far such orders have been small. An improvement in specifications on some classes of material is reported, but mill operations generally show but little change. The pig iron market continues to drag, the only movement being in low grade iron. Both iron and steel bars have been quiet. The scrap market is a trifle firmer. A sale of a round lot of No. 1 heavy melting steel scrap is reported at $12, delivered.

Iron **Ore.**—Little business is moving. Consumers are awaiting further developments in the iron market before placing orders for any material quantities. Sellers of Wabana ore state that new business for this year, together with undelivered portions of contracts in 1911, now aggregate 165,000 tons for this year's shipment. To complete the allotment of 225,000 tons for this market in 1912, 60,000 tons is yet to be sold. Importations during the week include 12,400 tons of Cuban and 5206 tons of Spanish ore.

Pig **Iron.**—New business develops slowly, inquiries for the higher grades of foundry iron being confined to small lots on which delivery is usually urgent. Sellers are not forcing sales and orders continue to be placed at the recent basis of $14.85 to $15.25, delivered, for standard brands of Pennsylvania No. 2 X. Cast iron pipe makers continue to show considerable interest in the market, although no further definite inquiries are reported. One Delaware River melter has closed for its second 5000 tons against an inquiry for 15,000 tons, which went to a Pennsylvania producer. Another melter has been after a 1000-ton lot, while still another would take on considerable iron if views regarding prices were met. A pipe foundry in Virginia has purchased 3000 tons for delivery over the first half. Inquiry for the higher Virginia foundry grades is light; few sales are noted, most of them being small lots at $12.25 to $12.50, furnace. No further inquiry is reported for rolling mill forge iron. A contract has been closed, it is understood, for 600 tons of charcoal iron, the inquiry for which was previously reported. Negotiations for 1000 tons of ordinary forge are still pending. Little new business in the steel making grades is reported. One Eastern melter has a tentative inquiry out for a moderate block of basic for second quarter, but is in no haste to close. Some of the recently reported transactions in this grade by melters in the central part of the State are understood to be still unclosed. Sales of low phosphorus iron have been confined to small lots at unchanged prices. Further curtailment in pig iron production in eastern Pennsylvania is planned. Princess, in Virginia, was blown in February 1. Prices are firm, but the market has not been tested with any sizable inquiries. The following range of quotations represents the market for standard brands, delivered in buyers' yards in this district during the first half:

Eastern Pennsylvania No. 2 X foundry	$14.85 to $15.25
Eastern Pennsylvania No. 2 plain	14.60 to 15.00
Virginia foundry	15.00 to 15.50
Gray forge	14.25
Basic	14.25
Standard low phosphorus	19.00 to 19.50

Ferroalloys.—Sales have been confined to small prompt lots, with no inquiry for future business coming out. Small lots of 80 per cent. ferromanganese are moving at $41, Baltimore. Odd carloads of 50 per cent. ferrosilicon have been sold at $70, delivered here, while inquiries for small quantities of furnace ferrosilicon are reported. The latter grade is quoted at $24.30 to $26.30, delivered.

Billets.—Small lot business predominates, although some fair quantities of both rolling and forging billets are being inquired for. Eastern mills do not report any material gain in activity. Prices are unchanged, basic open-hearth rolling billets being quoted at $22.40 to $23, delivered, while forging billets range from $26.40 to $27.40, delivered, according to analysis and specifications.

Plates.—While a large tonnage of material is under negotiation, particularly in boat plates, orders close very slowly. Current business comes out at about an even rate, but few orders exceed several hundred tons. Eastern mills are more encouraged with the outlook, and expect, with Western producers pretty well filled up, that a larger share of the pending business will come here. For the general run of business 1.30c. delivered, is quoted for ordinary plates.

Structural Material.—More encouraging conditions confront the trade, as far as local building work is concerned. The difficulties in connection with the Stock Exchange Building, involving 1800 tons, have been adjusted and Payne & Co. are understood to have the general contract. The Fuller Construction Company has the contract for the Bellevue-Stratford addition, 1500 to 1800 tons, and will begin work May 1. For the new factory buildings for the J. B. Stetson Company, 1100 tons is being figured on, which will be closed at an early date. Bids are in for the new Manufacturers' Club, 2300 tons, and plans are out for the new 12-story Hotel Vendig. Little new bridge work is reported. A fair demand for plain shapes is noted, with 1.30c. minimum quoted on ordinary business, although low figures continue to be named on fabricated material.

Sheets.—Business continues to be entered in fairly good proportions, although the bulk of the orders are small prompt lots. Specifications on old orders are satisfactory, as a rule, and Eastern mills continue well engaged. Prices are unchanged but firm. Western No. 28 sheets being quoted at 2.05c. delivered here, while Eastern mills making smooth, loose-rolled sheets easily obtain ¼c. to ½c. per lb. advance.

Bars.—Mills are supplied with sufficient orders, as a rule, to enable them to maintain the present rate of activity for a month or so, and are not forcing business. In instances efforts are being made to get better prices, although 1.20c. mill, equal to 1.27½c. delivered here, about represents the minimum for the better grades of iron bars. In some cases, however, this price has been slightly shaded. New business in steel bars is quiet, although specifications on contracts are good and 1.30c., delivered here, is being well maintained by the mills.

Coke.—Inquiries for several large blocks of furnace coke are noted, deliveries in instances extending over two years, but producers are slow to quote on such business. A fair amount of small lot business in foundry coke is reported, but no important sales have been made. Unfavorable weather conditions keep the market firm, the following quotations, per net ton, being named for delivery in this district:

Connellsville furnace coke	$3.95 to $4.05
Foundry coke	4.20 to 4.50
Mountain furnace coke	3.70 to 3.80
Foundry coke	4.00 to 4.40

Old Material.—The market appears to be a trifle firmer, although an absence of demand is noted in most of the grades. Railroad offerings this month are represented as being of about medium tonnage. A sale of a lot of 10,000 tons of No. 1 heavy melting steel at $12, delivered, is reported, although small lots move at $11.75, delivered. A lot of 1000 tons of low phosphorus steel scrap has been moved at about $15.60, delivered. Railroad wrought, borings and turnings have been quiet. The following range of prices about represents quotations at which ordinary current business for prompt shipment can be done for delivery in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate from Philadelphia varying from 35c. to $1.35 per gross ton, for shipment ranging from prompt to the remainder of the year:

No. 1 heavy melting steel scrap	$11.75 to $12.00
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap	15.50 to 16.00
Old steel axles	17.00 to 17.50
Old iron axles (nominal)	22.00 to 23.00
Old iron rails	16.00 to 17.00
Old car wheels	12.00 to 12.50
No. 1 railroad wrought	14.00 to 14.50
Wrought iron pipe	11.50 to 12.00
No. 1 forge fire	9.75 to 10.25
No. 2 light iron (nominal)	6.75 to 7.25
Wrought turnings	9.00 to 9.50
Cast borings	8.00 to 8.50
Machinery cast	13.00 to 13.50
Railroad malleable (nominal)	11.75 to 12.25
Grate bars, railroad	10.00 to 10.50
Stove plate	9.50 to 10.00

The Murray Iron Works Company, Burlington, Iowa, manufacturer of Murray Corliss engines and boilers, recently completed an addition to its boiler and fabricating shop, 120 x 300 ft., with 40 ft. clearance under the roof structure. The building is of steel construction and is spanned by two electric traveling cranes. The company is in the market for two drilling machines, adapted to drilling holes in plates after they have been rolled up into circles.

Cleveland

CLEVELAND, OHIO, February 6, 1912.

Iron Ore.—The first actual sale of Lake Superior ore for 1912 shipment was made during the week by a Cleveland interest. This sale was a 50,000-ton lot—35,000 tons of Bessemer and 15,000 tons of non-Bessemer. The price of the Bessemer was not fixed, the buyer agreeing to pay the market price that prevails during the season. It is stated that the non-Bessemer was sold at a definite price, the same that this seller got for the same ore a year ago, that price being slightly lower than the general market. An inquiry from an Eastern steel company in the Cleveland market for 150,000 tons of standard non-Bessemer ore has not attracted a great deal of interest for the reason that sellers of Lake Superior ore generally feel that to sell in the East at the present time they must make a considerable concession. They show no inclination to make a preferential price for the Eastern trade and are not yet ready to show their hand on the price question. In fact they do not know yet themselves what they will do regarding prices. The Eastern interest secured quotations from one seller, but these apparently were not satisfactory. Last year very little Lake Superior ore was sold to the Eastern furnaces and Cleveland firms do not view the outlook for such business as very promising this year. They point to the fact that local and foreign ores are selling in the East at lower prices than a year ago and that Lake Superior ores must be sold at about 25 cents a ton below last year's price to be on the same comparative basis with the Eastern market as a year ago. Price inquiries from Western consumers are quite frequent, but they are only market feelers and sellers generally are declining to quote. However, there are reports of some ore being offered at concessions from last year's prices. We quote prices as follows: Old range Bessemer, $4.50; Mesaba Bessemer, $4.25; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The United Steel Company, Canton, Ohio, has an inquiry out for 2000 tons of basic iron for March delivery. The foundry iron market is generally quiet, only two inquiries of any size having come out. One was from the American Radiator Company for 1000 tons of No. 2 for its Springfield, Ohio, plant for second quarter delivery and the other was from the Central Ohio Implement Mfg. Company for 800 tons of Nos. 2 and 3 for second and third quarter. The 3000 tons wanted for the Cleveland plant of the Westinghouse Electric & Mfg. Company has not yet been placed. Quotations are understood to have been made on this inquiry at about 50c. a ton above current prices. Local furnaces have as yet sold no iron for last half delivery and will not do so for the present except at some advance. Consumers are generally well covered with contracts and sellers do not look for much activity for a few weeks. Shipments on contracts are very satisfactory, buyers generally taking all the iron they have contracted for. We note the sale of 1000 tons of No. 2 Southern to a Toledo consumer for delivery in the next three months at $10.50, Birmingham. We quote the following prices for prompt shipment and for first half delivery, Cleveland:

Bessemer	$14.90 to $15.15
Basic	13.25
Northern foundry No. 2	13.25 to 13.50
Southern foundry No. 2	14.35 to 14.85
Gray forge	12.50
Jackson County silvery, 8 per cent. silicon	17.05

Coke.—Only one sale of furnace coke is reported—3000 tons for prompt shipment. There is a limited amount of contracting for foundry coke. Prices are firm. We quote standard Connellsville coke at $1.80 to $1.90 per net ton at oven. Standard Connellsville foundry coke is held at $2 to $2.25 for spot shipment and $2.15 to $2.40 for contract.

Finished Iron and Steel.—Specifications on contracts are holding up fairly well. Not a great deal of new business is coming out, although some of the mill agencies report a slight improvement in current orders. These, however, are nearly all for small lots, so that the aggregate tonnage is not large. The Carnegie Steel Company has taken an order from the American Shipbuilding Company for 1500 tons of plates and shapes for another oil barge to be built for the Standard Oil Company. A new passenger boat to be built by the Cleveland-Buffalo Transit Company, on which shipbuilders are now figuring, will require 2000 to 3000 tons of plates and shapes. The Northern Ohio Traction & Light Company is in the market for 1500 to 2000 tons of standard rails and 800 kegs of spikes. Another traction company has an inquiry for 800 to 1000 kegs of track bolts. The demand for light rails for coal mining companies has become more active. The demand for plates has improved. Mills are getting a good volume of orders from Ohio tank builders. The structural situation continues quiet. More activity is expected in this and other lines as soon as the weather moderates. There are unconfirmed reports that the 1.15c. price on steel bars is not being maintained in this market, but mills generally are adhering to that price. Plates are held at 1.15c. to 1.20c., Pittsburgh. While the lower quotation does not appear to represent the bottom of the market, sales are being made at the 1.20c. price. Structural material is quoted at 1.15c. to 1.20c. The demand for iron bars is light, with the price firm at 1.20c., Cleveland mill. Local jobbers report some improvement in their warehouse business.

Old Material.—The market is very dull and prices show further weakening. Local mills are well supplied and are entirely out of the market. They will not buy odd lots unless offered at very attractive prices. With business practically at a stand-still, there is nothing on which to base quotations, which are generally unchanged, but sales would be made at lower prices than the nominal quotations. The Pennsylvania Lines West received bids February 6 on about the usual tonnage. Dealers' prices, f.o.b. Cleveland, are as follows:

Per Gross Ton.	
Old steel rails, rerolling	$12.25 to $12.75
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.00 to 11.50
Old car wheels	12.00 to 12.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Light bundled sheet scrap	9.50 to 10.00
Per Net Ton.	
Iron car axles	$18.50 to $19.00
Cast borings	6.25 to 6.50
Iron and steel turnings and drillings	6.75 to 7.00
Steel axle turnings	7.25 to 7.75
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought	11.00 to 11.25
No. 1 cast	11.25 to 11.75
Stove plate	9.00 to 9.25
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, February 7, 1912.—*(By Telegraph.)*

Pig Iron.—Reports from different quarters indicate that Southern producers are more determined to adhere to the small price advances recently made by several furnace operators. While it is true that there is some prompt shipment iron to be obtained at $10, Birmingham, a buyer would have considerable difficulty in obtaining any large tonnage at this price. There are no large sales reported in this immediate territory and the small order business is correspondingly dull, but there are no requests to hold up contract shipments. On the contrary, many complaints are registered over delayed shipments, showing that consumers generally have no large yard stocks. A central Ohio melter is expected to close soon for 800 tons of analysis iron for second and third quarter, but it is understood that few agencies are willing to put out figures for the last named period. The same territory furnishes another inquiry for 1500 tons of mixed grades that will probably go to Northern producers. No early improvement is anticipated in the Northern foundry iron situation and $13, Ironton, for any first half shipment is the recognized quotation, with malleable trailing along at the same figure. So far as is known, practically all Northern and Southern furnace interests are refusing to quote on third and fourth quarter business. The lower foundry grades are scarce in both producing districts. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows for prompt shipment:

Southern coke, No. 1 foundry and 1 soft	$13.75 to $14.25
Southern coke, No. 2 foundry and 2 soft	13.25 to 13.75
Southern coke, No. 3 foundry	12.75 to 13.25
Southern coke, No. 4 foundry	12.50 to 13.00
Southern gray forge	12.50 to 13.00
Ohio silvery, 8 per cent. silicon	16.45 to 16.95
Lake Superior coke, No. 1	14.70 to 14.95
Lake Superior coke, No. 2	14.20 to 14.45
Lake Superior coke, No. 3	13.70 to 13.95
Basic, Northern	14.20 to 14.45
Standard Southern car wheel	25.25 to 25.50
Lake Superior car wheel	19.00

(By Mail.)

Coke.—Considerable trouble has been experienced in moving shipments promptly, but as the foundries in this vicinity are not operating up to capacity they have not been inconvenienced to any great extent. Very little new business is in sight, either for furnace or foundry grades, but prices are remarkably firm, espe-

cially in the Connellsville district, where 48-hr. brands are quoted all the way from $1.80 to $2 per net ton at oven for both prompt shipment and on future contracts. This advance has not materially benefited producers as limited tonnages have changed hands. Pocahontas furnace coke is quotable around $1.65 to $1.80, with the Wise County product bringing about 5c. per ton higher. Foundry grades in all three districts range from $2 to $2.35 per net ton at oven, although Connellsville producers are obtaining a small premium above these figures.

Finished Material.—The local market is devoid of any activity. No inquiries of any size are before the trade and the only business being transacted covers very small lots of steel bars. An exception can probably be made of sheets, that are in better demand. The mill price on steel bars is 1.15c., Pittsburgh, and on plates from 1.15c. to 1.20c. Local warehouse prices on bars and structural material are 1.60c. and 1.70c. respectively.

Old Material.—Railroad offerings are very light, partly attributable to bad weather conditions, and this fact has aided in keeping quotations at their present level. Unless there is some improvement in the demand it is generally conceded that prices will sink lower. The minimum figures given below represent what buyers are willing to pay for delivery at their yards in southern Ohio and Cincinnati, and the maximum quotations the selling prices, f.o.b. at yards:

Per Gross Ton.		
Bundled sheet scrap	$7.00 to	$7.50
Old iron rails	12.50 to	13.00
Relaying rails, 50 lb. and up	20.00 to	21.00
Rerolling steel rails	11.00 to	11.50
Melting steel rails	9.00 to	9.50
Heavy melting steel scrap	9.00 to	9.50
Old car wheels	11.00 to	11.50
Per Net Ton.		
No. 1 railroad wrought	$9.75 to	$10.25
Cast borings	5.25 to	5.75
Steel turnings	5.50 to	6.00
No. 1 cast scrap	10.00 to	10.50
Burnt scrap	6.50 to	7.00
Old iron axles	16.00 to	16.50
Locomotive tires (smooth inside)	11.50 to	12.00
Pipe and flues	7.00 to	7.50
Malleable scrap	7.50 to	8.00

The Cincinnati office of *The Iron Age* has been removed to 515 Mercantile Library Building. Telephone, Main 1381.

Birmingham

BIRMINGHAM, ALA., February 5, 1912.

Pig Iron.—The largest transaction reported in the past week involved 14 storage warrants for 100 tons of foundry grades each, that were sold on a basis of $10 and $9.50 at furnace for Nos. 2 and 3 foundry, respectively. A fair tonnage in smaller lots than 500 tons each, for shipment in the first half, was sold, and a basis of $10.50, Birmingham, for No. 2 foundry was the price received in some cases. Considerably more interest in market conditions was manifested in all quarters of the trade, and the tonnage submitted for early requirement was large. At this time the largest consideration pending is for 10,000 tons of Nos. 2 and 3 foundry for shipment extending through the third quarter. A lot of 5000 tons for first half shipment is also pending, and will probably be closed for early in the week. To offset the most recent reduction in the rate of production, one City furnace has just been blown in, making a total of 18 stacks in operation on coke February 1. The stock accumulations as of February 1 have not yet been compiled, but reports indicate that shipments were in excess of the output practically all of the month, and that a substantial decrease has been made since the first of the year. The scarcity of low grades continues to be a feature of the market, and has resulted in very attractive prices, comparatively, for gray forge and mottled. The former has been quoted at $9.50, but the tonnage available was small. Current quotations on the regular grades are unchanged, and in the majority of cases a basis of $10.25 to $10.50 for No. 2 foundry is being asked for deliveries in the first half. None of the producers is yet willing to offer tonnage for shipment in the second half, but it has been intimated that contracts entered at a $10.50 schedule for the first half could be made to extend into the third quarter. The efforts of Southern producers to obtain lower freight rates to Northern and Eastern points took definite form in the week and results in that connection will be watched with interest generally. The plans of a local producer to rebuild and enlarge one stack have also just taken form, although it is probable that the additional capacity will produce steel making iron. We continue to quote for first half shipments as below, but consider the prices named as applicable to competitive markets, higher prices than those quoted being obtainable in strictly Southern territory. We quote as follows, per gross ton, f.o.b. cars at Birmingham district furnaces:

No. 1 foundry and No. 1 soft	$10.50
No. 2 foundry and No. 2 soft	10.00
No. 3 foundry	9.50
No. 4 foundry	9.25
Gray forge	9.00
Standard basic	10.00
Off basic	9.50

Cast Iron Pipe.—The results of lettings held in Southern cities since last report are not fully known, but it is understood that an attractive tonnage has been added to local order-book requirements. Repairs to the North Birmingham plant are being rushed to completion, and it has just been announced that the Bessemer plant of the United States Cast Iron Pipe & Foundry Company will undergo repair as soon as the North Birmingham plant has been put in operation. Shipments from all plants are now being made at a very satisfactory rate, with a shortage of certain sizes reported. So far as is known, quotations have been fully maintained in most recent transactions, and we continue to quote as follows, for water pipe, per net ton, f.o.b cars here: 4 to 6 in., $23; 8 to 12 in., $22; over 12 in., average $21, with $1 per ton extra for gas pipe.

Old Material.—Quotations on certain grades are revised, but the demand in the past week did not indicate any improvement. Old rails and axles are reported very scarce, but little effort is being made by dealers to replenish their stocks. There is practically no interest manifested in country grades, with a smaller movement during the week of light steel scrap. Asking prices are as follows, per gross ton, f.o.b. cars here:

Old iron axles (light)	$12.50 to	$13.00
Old steel axles (light)	11.50 to	12.00
Old iron rails	11.50 to	12.00
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	9.00 to	9.50
No. 1 country wrought	6.00 to	6.50
No. 2 country wrought	5.50 to	6.00
No. 1 machinery	8.50 to	9.00
No. 1 steel	8.00 to	8.50
Tram car wheels	7.50 to	8.00
Standard car wheels	9.50 to	10.00
Light cast and stove plate	6.00 to	6.50

St. Louis

ST. LOUIS, MO., February 5, 1912.

The market is in a quieter state than has been experienced since before the buying movement set in last November. Buyers pretty generally are out of the market as far as new business of consequence is concerned, but this is not affecting the firmness of prices in any division, for the impression of dealers is that the situation is one to be expected at the hight of the winter severity due at this particular period.

Pig Iron.—Inquiries have been only for peddling lots, with the exception of some inclination to look for No. 4 Southern. This, however, is so scarce that it is scarcely a competitor with scrap which is being taken to a considerable extent instead. No. 2 continues firm at $10.50 for Southern, Birmingham basis, while Northern is on a spread of $13 to $13.50. Basic, malleable, carwheel and other irons are not being sought. Shipments on contract are moving forward freely and consumption thus continues.

Coke.—The market has been without feature, but prices are well held. Shipments generally are well up with contracts, as is naturally to be expected in connection with the movement of pig iron. By-product coke is especially firm, with $5.25 delivered the asking price.

Finished Iron and Steel.—Orders coming in are for small lots, and quick shipment remains the feature. In standard section, steel rails, the inquiries reported last developed into orders for 500 tons and 2000 tons respectively. There have been no other orders or inquiries. In light rails there is very little moving and there is little prospect until the question of a coal strike is settled. In bars there is a little prompt shipment business, and prices remain at 1.15c. Pittsburgh. Plates show no sizeable movement and the prices are the same, 1.15c. to 1.20c. Pittsburgh. Track fastenings are in fair demand at former prices. When the severe weather lets up there is some promise of new building operations, increasing the demand for structural material.

Old Material.—The mills are buying only for imperative needs or taking in real bargains when these come to their notice. They are not in any wise actively in the market. The only list out during the week was one of 1500 tons from the Missouri Pacific which closes later this week. As a result of the situation prices are beginning to show a softening tendency. We quote dealers' prices, f.o.b. St. Louis, as follows:

	Per Gross Ton.	
Old iron rails	$14.00 to	$14.50
Old steel rails, rerolling	11.50 to	12.00
Old steel rails, less than 3 ft	11.00 to	11.50
Relaying rails, standard section, subject to inspection	21.50 to	22.00
Old car wheels	13.00 to	13.50
Heavy melting steel scrap	10.50 to	11.00
Frogs, switches and guards cut apart	10.50 to	11.00
	Per Net Ton.	
Iron fish plates	$12.50 to	$13.00
Iron car axles	17.50 to	18.00
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	10.00 to	10.50
Railway springs	9.75 to	10.25
Locomotive tires, smooth	12.00 to	12.50
No. 1 dealers' forge	8.00 to	8.50
Mixed borings	6.00 to	6.50
No. 1 busheling	9.00 to	9.50
No. 1 boilers, cut to sheets and rings	8.00 to	8.50
No. 1 cast scrap	8.50 to	9.00
Stove plate and light cast scrap	8.00 to	8.50
Railroad malleable	8.50 to	9.00
Agricultural malleable	7.50 to	8.00
Pipes and flues	8.00 to	8.50
Railroad sheet and tank scrap	7.50 to	8.00
Railroad grate bars	8.00 to	8.50
Machine shop turnings	7.50 to	8.00

M. Cohen announces that he is now engaged in the scrap iron, rubber and metal business at 709 Central National Bank Building, St. Louis, following the severance of his connection with the Cohen-Schwartz Rail & Steel Company.

Buffalo

BUFFALO, N. Y., February 6, 1912.

Pig Iron.—The market shows some evidence of improvement, considerable new inquiry having developed, aggregating perhaps 15,000 to 20,000 tons of foundry grades and malleable. A large proportion of the inquiry is for the lower grades of foundry for pipe makers' uses and for forge iron.. Quite a run of small order business, carloads to 200 and 300-ton lots and supplementary orders, is also noted, being a clear indication that foundries are busier than was anticipated when the original orders were placed. One furnace interest reports the booking of between 4000 and 5000 tons, mostly in small miscellaneous orders for foundry grades and malleable. There has also been continued heavy specification for shipment on contracts. Produers are inclined to be stiff in their views as to prices, and the current schedule, which we quote below, f.o.b. Buffalo, is generally well maintained:

No. 1 X foundry	$13.75 to	$14.25
No. 2 X foundry	13.75 to	14.00
No. 2 plain	13.50 to	13.75
No. 3 foundry		13.50
Gray forge	13.25 to	13.50
Malleable	13.75 to	14.25
Basic	14.00 to	14.50
Charcoal	15.75 to	17.25

Finished Iron and Steel.—A slightly better tone is observable in bar products and small shapes, specifications on contracts coming along in good volume. A number of inquiries are noted from automobile and shop forging plants. In nails and wire products business is good and some increase in activity is noted in black and galvanized sheets. Some betterment in demand is also shown in tin mill products. In fabricated structural lines the market is quiet, so far as large work is concerned, although a number of small jobs are under way or soon to come out. Bids are being taken this week for a garage building, 100 x 150 ft., at Main and North streets, Buffalo, for the Mobile Construction Company, and for a large factory and stable and garage building for the Hoefler Ice Cream Company. Bids will be up February 16 for the auditorium and laboratory building for Cornell University, Ithaca, requiring about 300 tons. Bids will also soon be received for factory, laboratory and office building for the Foster-Milburn Company, Buffalo, requiring a moderate tonnage.

Old Material.—The market is quiet, the restriction in transactions being due to some extent to severe weather conditions rendering the handling of material difficult. The demand for heavy melting steel is good, but the available supply is limited and dealers are not anxious to sell in larger lots than carloads at the prices offered by consumers. Dealers who are short of heavy steel stock are paying consumers' prices in order to fill immediate deliveries required on contracts. An advance in the price of this commodity is looked for in consequence. Some dealers also express a feeling of confidence as regards betterment in prices for other lines. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$12.50 to	$12.75
Low phosphorus steel	15.75 to	16.00
No. 1 railroad wrought	14.00 to	14.25
No. 1 railroad and machinery cast scrap	13.50 to	14.00
Old steel axles	18.50 to	19.25
Old iron axles	22.00 to	22.50
Old car wheels	12.75 to	13.00
Railroad malleable	12.50 to	12.75
Boiler plate, sheared	13.75 to	14.25
Locomotive grate bars	11.00 to	11.25
Pipe and tank	9.75 to	10.25
Wrought iron and soft steel turnings	7.25 to	7.50
Clean cast borings	6.50 to	6.75

Boston

BOSTON, MASS., February 6, 1912.

Old Material.—The market has made no change in the week, the conditions of demand and the prices remaining as they were. The prices quoted below are those offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$9.00 to	$9.50
Low phosphorus steel	11.45 to	11.95
Old steel axles	14.00 to	14.50
Old iron axles	17.00 to	18.00
Mixed shafting	13.00 to	14.00
No. 1 wrought and soft steel	10.50 to	11.00
Skeleton (bundled)	7.00 to	7.50
Wrought iron pipe	8.50 to	9.00
Cotton ties	7.00 to	7.50
No. 2 light	4.50 to	5.00
Wrought turnings	6.00 to	6.50
Cast borings	5.25 to	5.75
Machinery, cast	12.50 to	13.00
Malleable	9.25 to	9.75
Grate bars	6.00 to	6.50
Stove plate	8.00 to	8.50
Cast iron car wheels	11.75 to	12.00

The German Iron Market

BERLIN, January 25, 1912.

The strength of the iron market continues unabated. The price movement is still upward. On the Düsseldorf Exchange last week the price of English No. 3 foundry iron was quoted at 66 to 70 marks; English hematite, 84.50 to 87.50 marks; basic steel bars, 110 to 115 marks; bands, 132.50 to 137.50 marks; basic steel tank plates, 130 to 132 marks; boiler plates, 140 to 142 marks. Owing to the fact that coke prices have just been advanced 1 mark per ton, the Pig Iron Syndicate, it is reported, will at an early date make a general advance in pig iron prices of about 1.50 marks. The West German Iron Dealers' Cartel has called a meeting for to-morrow in order to advance prices by 5 marks, referring apparently to bars and similar products. An advance on Luxemburg iron is also looked for early in February.

At a meeting of the Pig Iron Syndicate held several days ago it was reported that the calls for delivery this month have been very brisk and that the foreign demand is also very strong. Under these circumstances the stocks of iron on hand have been considerably reduced. From the Luxemburg-Lorraine district it is also reported that iron on order is being taken at a rapid rate, and a better demand for minette ores is observed. From other departments of the trade hardly any change is to be reported. Mills running on all products are very busy and shipments are made in regular course.

The deadlock over the renewal of the Steel Works Union has not been broken, and there are no indications that this will occur soon. Several days ago the stock market was sharply depressed over a report to the effect that negotiations had been entirely stopped, owing to the excessive demands of the big mills previously mentioned in this correspondence; but this was later denied. Nevertheless the outlook for the prolongation is regarded as almost hopeless.

The Belgian market still sends in reports of rising prices. Half rolled steel material for export, which had been without change for some time, has now been marked up 2 to 3 shillings. This change brings the fol-

lowing scale into force, the prices being apparently f.o.b. Antwerp: Ingots, 88 to 89 shillings; blooms, 89 to 91 shillings; muck bars, 92 to 94 shillings. Belgian basic pig iron was raised to 70 francs.

New York

NEW YORK, February 7, 1912.

Pig Iron.—Barring occasional 100 and 200-ton lots the business in pig iron has been light. There has been some demand, however, for pipe iron and two Eastern pipe foundries have been buyers, one taking 10,000 tons in the past week. So far as Buffalo furnaces are concerned, their immediate prospect for business is in western New York territory. Earlier in the month some business was done in New England by one or two New York State furnaces, sales being at $15.20 to $15.30 delivered, figures which Buffalo furnaces with a freight of $2.65 have not attempted to meet, some sales having recently been made at Buffalo at from $13.50 to $13.75 for No. 2 X. Virginia furnaces have done some business in their specialties. Most New England buyers seem to be supplied with iron for several months ahead and a similar condition exists in New York territory, including New Jersey. We quote as follows for Northern iron at tidewater: No. 1 foundry, $15; No. 2 X, $14.75; No. 2 plain, $14.50 to $14.75. We quote Southern iron at $15 for No. 1 foundry and $14.50 to $14.75 for No. 2.

Finished Iron and Steel.—Keen competition in structural lines continues. Prices on which some of the large work reported last week was closed were very low, but the general run of quotations lies within the range given below. To the 25,000 tons of structural work pending in Eastern territory in large jobs may be added 14,000 tons which will be involved in the power-house on 201st street for the United Electric Light & Power Company, a project which has finally become definite, and several thousand tons for section 2 of the New York Subway on lower Broadway, now settled. To these may also be added an inquiry for seven bridges for the Boston & Maine, aggregating 400 tons, and two bridges for the New Haven, one at Phillipsdale, R. I., 200 tons, and one at Westerly for 100 tons; a building for the New York Times, West Forty-third street, 2500 tons, and an addition which it is understood the Travelers' Insurance Company is to build in Hartford, 1000 tons. One of the large contracts closed since the last report is one for 3500 tons for the Coco-Cola Building, Forty-second street, west of Seventh avenue, which went to Post & McCord. Quotations are: Steel bars, plates and plain structural material, 1.31c. to 1.36c.; bar iron, 1.27c. to 1.32c., all New York. Plain material from store, New York, 1.70c. to 1.80c.

Old Material.—Some improvement is observed in the demand for cast scrap, but other classes of old material are so quiet that dealers are greatly discouraged. Inquiries from consumers are almost wholly lacking. An incident of the week is the diminished quantity of old material appearing on railroad lists. So far, the lists that have come out are running much below their usual size. The character of these lists indicates that the railroad companies are sharply curtailing their shop work. Dealers quote, per gross ton, New York and vicinity, as follows:

Old girder and T-rails for melting	$9.25 to $9.75
Heavy melting steel scrap	9.25 to 9.75
Relaying rails	20.00 to 20.50
Rerolling rails (nominal)	11.50 to 12.00
Standard hammered iron car axles (nominal)	20.00 to 21.00
Old steel car axles	14.25 to 14.75
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track scrap	11.00 to 11.50
No. 1 yard wrought, long	10.00 to 10.50
No. 1 yard wrought, short	9.25 to 9.75
Light iron	4.00 to 4.50
Cast borings	6.00 to 6.25
Wrought turnings	7.00 to 7.50
Wrought pipe	9.25 to 9.50
Old car wheels (nominal)	12.00 to 12.50
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.75 to 9.00
Locomotive grate bars	9.00 to 9.50
Malleable cast	9.00 to 9.50

Cast Iron Pipe.—The city of Boston yesterday opened bids on 2900 tons of 3 to 16-in. and 25 tons of specials. The Department of Water Supply, Gas and Electricity of the city of New York, in addition to the bids to be opened February 9, will receive bids until February 13 on 2513 tons of pipe and 300 tons of special castings for Brooklyn. Considerably more business is coming out from private buyers, the volume of such buying running nearly 50 per cent. larger than at the corresponding time last year. A notable feature of this class of business is the increase in requirements. Quite a number of buyers are asking prices on double the quantity they purchased at this time last year. The outlook has thus grown decidedly better, and if the demand continues it will very likely have a strengthening effect on prices. Carload lots of 6-in. are quoted at $22 to $23 per net ton tidewater.

Ferroalloys.—A fairly good business in small lots of 50 per cent. ferrosilicon has been done by New York dealers. Carload lots are quoted at $70 and 100-ton lots at $69, while these prices have been shaded under some circumstances. Eighty per cent. ferromanganese is held at $41 by producing interests and most dealers.

Metal Market

NEW YORK, February 7, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Feb.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
1	14.25	14.12½	43.25	4.25	4.17½	6.55	6.40
2	14.25	14.00	43.05	4.25	4.15	6.55	6.40
3	14.25	14.00	....	4.10	4.00	6.55	6.40
5	14.25	14.00	43.35	4.00	3.90	6.55	6.40
6	14.25	14.00	43.80	4.00	3.90	6.55	6.40
7	14.25	14.00	44.00	4.00	3.90	6.55	6.40

Trade in metals is generally quiet. Copper is weaker, in the absence of substantial buying. Spot tin is scarce, tightly held and not much has been done in futures, despite the large quantity en route here. The price of lead has been reduced twice within the week and now is down to 4c., New York, and the trade declares the situation very unsatisfactory. Spelter continues firm and not plentiful. Cookson's antimony is still lower than Hallett's.

Copper.—The copper market has continued dull throughout the week and at present is weaker, in the absence of substantial buying. Since the last report the market has been largely nominal and it is not believed that there will be any notable activity until after the figures of the Copper Producers' Association for the month of January have been issued and digested. Electrolytic copper has been offered and sold within the week at 14c. cash, New York, delivery 30 days in the Naugatuck Valley. It has been reported that this price has been shaded by second hands, but some of these offerings have not found takers. Prime Lake copper is quoted at 14.25c., although some dealers maintain that certain brands command 14.50c. and over. Copper is quoted in London to-day at £61 12s. 6d. for spot and £62 7s. 6d. for futures. The exports of copper this month have been 7248 tons.

Copper Averages.—The Waterbury average for the month of January was 14.50c. The average New York price of Lake copper for January was 14.50c. and for electrolytic 14.30c.

Pig Tin.—It was very quiet in pig tin last week, but there has been an improvement in the last three days because of the pressing needs of consumers which compelled them to buy, an influence which accentuated the scarcity in the spot supply. The Minneapolis arrived to-day with 675 tons, but this arrival did not ease the market to any appreciable extent. Next week the Minnetonka will get in with 1700 tons, said to be the largest shipment ever received here. Reports from London are that the steamer sailing from that port December 8 has little or no tin aboard. The metal, both spot and futures, is tightly held and it is believed that this condition may exist for some time. The price of tin in London to-day is £195, futures £192 2s. 3d. The arrivals of tin this month have been 930 tons and there is reported afloat 2735 tons. The price of tin to-day is quoted at 44c.

Tin Plates.—There is little change in the New York market in tin plates. The price of 100-lb. coke plates remains $3.64 and the price of tin plates laid down at Swansea, Wales, is unchanged at 13s. 6d.

Lead.—The news of the week is that of two further reductions in price by the American Smelting & Refining Company, which have brought the New York price down to 4c. and have caused the trade to be highly dissatisfied with that metal. Very recently lead was reduced 20 points, and on February 3 it was further reduced 15 points, and on February 5 it was put down 10 points more.

Spelter.—Spelter continues strong and not plentiful. Prime Western spelter for immediate delivery commands 6.55c., New York, and is difficult to get. Some producers are behind in their deliveries. The demand

continues to come principally from middle Western galvanizers.

Antimony.—There is little activity, the feature continuing to be the reduced price of Cookson's, which is quoted at 7.25c. Hallett's may be had at 7.50c. and Chinese and Hungarian grades are quoted at 6.90c. The fact that Cookson's is lower than Hallett's continues to excite comment.

Old Metals.—The market is weak. Dealers' selling prices have been reduced as follows:

	Cents per lb.
Copper, heavy and crucible	13.00 to 13.25
Copper, heavy and wire	12.75 to 13.00
Copper, light and bottoms	11.75 to 12.00
Brass, heavy	9.00 to 9.25
Brass, light	7.00 to 7.25
Heavy machine composition	11.00 to 11.25
Clean brass turnings	8.25 to 8.50
Composition turnings	9.50 to 10 00
Lead, heavy	3.75
Lead, tea	3.50
Zinc, scrap	5.25

Chicago

FEBRUARY 6.—While the movement of metals has developed no features of special prominence, the volume of sales has been showing a steady increase. Changes in price were unimportant. We quote as follows: Casting copper, 14.37½c.; Lake, 14.62½c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 44c.; small lots, 46c.; lead, desilverized, 4.25c. to 4.30c., for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.50c. to 6.60c.; Cookson's antimony, 8.75c., and other grades, 7.75c. to 8.25c., in small lots; sheet zinc is $8, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount, in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 11.75c.; copper bottoms, 10.75c.; copper clips, 11.50c.; red brass, 10.75c.; yellow brass, 8.50c.; lead pipe, 3.90c.; zinc, 4.25c.; pewter, No. 1, 26c.; tinfoil, 37c.; block tin pipe, 38c.

St. Louis

FEBRUARY 5.—The metal markets have shown a weakening tendency in some sections and a firmer tone in others during the week. Lead and spelter are off, both in the metal and the ore. Lead is quotable here to-day at 4.10c., while spelter is priced at 6.20c. to 6.35c., according to terms and delivery. Tin is held at 43.60c. Lake copper is quotable at 14.60c. and electrolytic at 14.35c. Cookson's antimony is off again to 7.60c. The market generally is dull as well as weak. In the Joplin mining district the past week ore prices slumped, lead especially, the new price being $55 per ton, as against $60. Zinc blende's top price was $49 on an assay basis of $46 for 60 per cent. metal, the range being down to $42. Calamine was in good demand at $23 to $26 on an assay basis of 40 per cent. metallic zinc. An effort to prevent the lowering or removal of the tariff on zinc ore is to be launched by a Joplin organization which will send representatives to Washington. On miscellaneous scrap metals we quote: Light brass, 4.50c.; heavy brass and light copper, 8.50c.; heavy copper and copper wire, 9.50c.; zinc, 3.50c.; lead, 3.50c.; pewter, 20c.; tin foil, 29c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, February 7, 1912.

The stock market has been rather quiet since last report, with no wide fluctuations in prices except in the United States Steel stocks which declined sharply on the quarterly publication of earnings. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com...	⅞- 1⅛	Pressed Steel, com..	31½- 32½
Allis-Chalm., pref...	6⅝- 7	Pressed Steel, pref..	100¼-100½
Baldwin Loco., pref.	102⅜-103⅛	Railway Spring, com.	28½- 29
Beth. Steel, com...	31⅜- 31⅞	Railway Spring, pref.	101 -101½
Beth Steel, pref...	59⅛- 61	Republic, com.....	21¾- 23⅝
Can, Com.....	11½- 12	Republic, pref.....	76½- 81⅛
Can, pref.....	90⅝- 92⅞	Sloss, pref.....	90
Car & Fdry., com..	49¾- 51¼	Pipe, pref.....	50 - 51
Car & Fdry., pref...	115¾-115⅞	U. S. Steel, com....	58⅜- 63¾
Steel Foundries.....	29	U. S. Steel, pref...	108½-110¾
Colorado Fuel.....	26 - 26½	Westinghouse Elec..	69¾- 71
General Electric....	156¾-158¾	Va. I. C. & Coke...	67¾- 68¼
Gr. N. Ore Cert....	36 - 38½	Am. Ship, com.....	50
Int. Harv., com....	105½-106½	Am. Ship, pref.....	100 -103
Int. Pump, com....	28½- 30	Chic. Pneu. Tool...	47½- 49¾
Int. Pump, pref....	79 - 79¾	Cambria Steel	42⅜- 43⅜
Lackawanna Steel..	30 - 30½	Lake Sup. Corp....	27½- 28¼
Locomotive, com....	33 - 33½	Pa. Steel, pref.....	100
Locomotive, pref....	103 -103¼	Warwick	11 - 11½
Nat. En. & St., com.....	14	Crucible Steel, com.....	11¾
Nat. En. & St., pref.	94 - 94½	Crucible Steel, pref.	80½- 82⅛
Pittsburgh Steel, pref.....	103		

Dividends Declared

The Inland Steel Company, regular quarterly, 1¾ per cent. and an extra dividend of 3 per cent., payable March 1. A year ago the same extra dividend was paid.

The American Radiator Company, regular quarterly, 2 per cent., an extra dividend of 2 per cent. and 10 per cent. in common stock on the common stock, payable March 30, and regular quarterly, 1¾ per cent. on the preferred stock, payable February 15. A year ago 2 per cent. extra was paid on the common stock.

The Wheeling Steel & Iron Company, regular quarterly, 2 per cent. payable February 8.

The International Harvester Company, regular quarterly, 1¾ per cent. on preferred stock, payable March 1.

Personal

E. C. Felton, president of the Pennsylvania Steel Company, Philadelphia, started February 3 for a month's trip to Panama, Jamaica and Cuba. While in Cuba he will give considerable time to the inspection of the company's ore properties.

The Inland Steel Company, Chicago, announces, effective February 15, the appointment of O. P. Blake as assistant general manager of sales, with headquarters at St. Louis, in charge of Southwestern territory. F. R. Meyer, Jr., has been appointed district sales manager at St. Louis and J. B. Sharp district sales manager at Kansas City. Recognizing the importance of Kansas City as a market for its products the company will open an office there February 15, room 511 R. A. Long Building.

Dennis H. Long, on February 1, became resident manager of the United States Cast Iron Pipe & Foundry Company in Louisville, Ky., succeeding his father, George J. Long, who decided to relinquish the duties of superintending the company's local plant, although he will continue as vice-president of the company and chairman of the manufacturing committee. The new manager is a grandson of the late Dennis Long, who founded the pipe works at Louisville, and is a graduate of Purdue University.

James M. Motley, 71 Broadway, New York, has been appointed purchasing agent of the Panama Tramway Company, which is building a street railroad in the city of Panama.

Richard Peters, who has been in charge of the Philadelphia sales office of the Pennsylvania Steel Company and Maryland Steel Company for the past 15 years, resigned from active service February 1. Robert W. Read succeeded him as sales agent on that date in charge of the Philadelphia sales office.

H. C. Davis has been appointed manager and superintendent of the Thomas plant of the Brier Hill Steel Company at Niles, Ohio, and W. T. Hardesty, manager and superintendent of the Empire plant at Niles, Ohio. They have been connected with these plants for a number of years.

A. F. Huston, president of the Lukens Iron & Steel Company, Coatesville, Pa., is in Florida, where he will spend about two months.

The recent death of Edward A. Downey, district sales manager of the National Tube Company at St. Louis, has resulted in some changes in branch offices of that company. Edward Worcester, Jr., formerly district sales manager at Atlanta, Ga., has been transferred to St. Louis. H. P. Nelson, formerly assistant to Mr. Downey at St. Louis, has been transferred to Atlanta, Ga. R. R. Lally, Jr., has been transferred from the selling department of the Pittsburgh office to St. Louis to succeed Mr. Nelson.

S. S. Knight has been elected vice-president and general manager of the Scullin-Gallagher Iron & Steel Company, St. Louis. At the annual meeting of the board of directors, January 29, the office of assistant to the president, which he has held for the past year, was abolished.

Charles Booth, who has been connected with the Chicago Pneumatic Tool Company since its organization, has been appointed district manager of the company's New England territory, with headquarters at 191 High Street, Boston, vice J. M. Towle, resigned. Up to September 1, 1911, Mr. Booth was vice-president of the company. At that time he was compelled to resign owing to ill health.

The Manufacturer and Industrial Safety

Accident Prevention in Relation to Machinery—What the Law Should Require—Economic Phases of Safeguarding

BY JOHN CALDER*

One of our authorities on industrial mortality, who is connected with one of the large accident insurance companies and is familiar with the figures throughout the United States, has estimated that the deaths among adult male wage-earners alone, due to accidents, amount to 35,000 a year and that the non-fatal injuries of occupation cannot be much less than 2,000,000 additional. Such figures take no account of the many accidents to females and young persons and are based on data which are admittedly incomplete and below the mark.

It is staggering to find that in a single year of peaceful industry we kill and wound, without intent, more people than in several great military campaigns where disablement is deliberately pursued with all the engines of war.

Causes of Industrial Accidents

From 25 years' experience in factories and the investigation of some thousands of accidents, I have found that, for such casualties as are preventable, the responsibility is pretty evenly divided between indifferent employees and neglectful employers.

I believe that factory accidents are due chiefly to the following causes: Ignorance, carelessness, unsuitable clothing, insufficient lighting, dirty and obstructed work places, neglect of fire precautions, defects of machinery and structures, absence of safeguards and, most important of all, lack of safe working supervision and of instruction of the workmen.

Not all of our accidents, however, are preventable and nothing is to be gained by blinking this fact. Many of them are purely fortuitous and accidental in the most literal sense, no blame being attachable to any one. Yet when every allowance is made for inevitability, I am firmly convinced from a long practical experience that at least one-third of all our factory injuries can and ought to be prevented by legal, administrative and practical measures which I shall endeavor briefly to describe and illustrate.

At the outset let me say that this is chiefly a matter for experts with engineering training, though in the United States many such men have yet to be educated, experienced in risks, hired and called upon to show results, not merely or even chiefly in the work of State factory inspection, but as part of the organization in every factory.

The above scientific and practical procedure applies to the whole program of factory safety matters; but I deal solely at this time with accident prevention in relation to machinery. I direct your attention briefly to three aspects of this important matter, viz.:

1. What the state or "all-of-us" can do.
2. What the manufacturer can do.
3. The influence of efficiency on industrial safety.

What State Laws Should Provide

(*a*) Because of our extensive interstate commerce we need, as far as possible, uniform state safety laws. Dangerous machinery and other appliances, both new and second-hand, used in the arts, are constantly moving over state boundries and such danger as is inherent in the machine itself, apart from its future application, should be provided for by its maker by statutory requirements.

(*b*) The State safety laws should not only be uniform; they should also be definite and practical. At present the legal responsibility for safety under such laws—often copied unintelligently from foreign statutes or a mangled compromise emerging at the end of a political session—is so tangled that it is sometimes hard for the employer and inspector alike to know where they stand.

(*c*) The remedy is simple. Prepare such statutes under the best expert advice. Keep them non-partisan and take a step forward, which has long been needed, by removing every permissive clause from these statutes and making the employer—and also the maker of machinery—solely responsible for the guarding of all dangerous parts or appliances which they use or originate, letting proved impracticability be the only defense for non-observance.

(*d*) Do not attempt to enumerate in the statute all specific dangerous machines—excepting, of course, elevators and common public utilities in structures, in power generation and transmission. Such a catalogue is attempted in nearly every State factory statute we have, but it is always inconsistent and imperfect and prevents progress in industrial safety.

SPECIFY DANGEROUS MECHANICAL ELEMENTS.

(*e*) Catalogue rather in the factory safety law the dangerous mechanical elements which are found on machinery and appliances. These are well known to engineers and less than a score in number and comprise the following:

1. All engaging toothed or other gears, rolls, drums and slides of every description on the machine.
2. The spaces between fixed and moving parts of any machine, or between the latter and structures near it, leaving insufficient working clearance—in no case less than 18 in.—for any person employed thereon or near it.
3. Pulleys and clutches.
4. Belts, bands and driving chains.
5. Flywheels and starting balance wheels.
6. Shafting and spindles and all couplings or projections thereon or upon reciprocating or other moving parts of machines.
7. Counterweights and balance gears and other suspensions.
8. The actual element on every machine which comes into contact with the work, and cuts, shears or otherwise operates upon the latter, for instance the circular saw blade on the saw mill, the punch and die in the press, the revolving cutter in the milling machine, etc.

Insist in the law that these elements be always guarded where found "unless they are of such form and in such position as to be as safe to all as if guarded" and you will have, without listing thousands of machines, a working category of machinery risks. The National Civic Federation has recently adopted this suggestion as the basis of its Model Safety Act.

(*f*) These steps will relieve the factory inspectors entirely of their present impossible burden, viz., their duty in so many dangerous cases to take the initiative and create the obligation on the employer's part by serving notice on him to safeguard. How is a factory inspector, who sees you but once a year, to get an idea of what you need?

No possible force of inspectors will make much progress in safety work unless the onus to protect the worker is placed fairly and squarely on the employer's shoulders and on his engineers and on those of the negligent maker of appliances.

WEAKNESS OF PRESENT STATE METHODS

(*g*) At present the law practically invites the employer, in many cases of danger, to create risks freely and do nothing towards safeguarding until an inspector, who can only visit the plant once a year at most, happens to make a complaint or recommendation. Even then, if legal process results, it is a long drawn out one with a very doubtful issue, for the judge has a very imperfect statute before him.

(*h*) This unbusinesslike procedure would be swept away at once if the obligation to safeguard rested upon the employer from the moment of starting a dangerous machine and at all times thereafter. Meanwhile the inspector of factories, if he is an expert with a secure and honorable future in the service of the State, which unfortunately is not always the case, has ample scope for edu-

*From an address before the City Club of Philadelphia, January 13, 1912. Mr. Calder is manager of the Remington Typewriter Works, Ilion, N. Y.

cational work especially among the owners of the small plants and for occasional punitive and disciplinary measures based on a clear legal obligation on the employer's part which the courts will respect and uphold.

(*i*) In recent years this task of industrial betterment, owing to the wholly inadequate financial assistance afforded labor commissioners has been largely performed by our well trained casualty insurance inspectors, so far as their policy holders only are concerned, and by the engineers and executives of many corporations who have given their experience freely to the public.

(*j*) All that has been donely recently in several States has been in the right direction. I believe that we should increase the number of engineering experts on the State staffs and should seek to sever for all time the last possible connection of our factory departments with political influence and patronage. It is surely high time to cease making life and limb the playthings of unqualified office seekers. Until this is done no State administration will command the absolute respect and confidence of employers and workmen.

THINGS THE STATE CAN DO.

To sum up: What can the State do in the premises?

1. It can give us a better, simpler, more scientific and effective safety law and can promote uniform State action on information as to what is actually transpiring in our factories.

2. It can place the safeguarding initiative and obligation fairly and squarely upon the men who create the accident risk, viz., the employer, the machinery maker and the careless employee and *not* on the inspector as at present. The latter can never be other than an occasional skilled visitor, reporter and adviser; he cannot be ubiquitous.

3. The State can co-ordinate through its experts the safeguarding of the best plants in the States—these are our true safety museums—and attempt an educational task, long overdue but not expensive, viz., the illustration by special bulletin of the various trade risks and their practical remedies.

4. It can provide for compulsory registration of all existing factories and every new factory. I do not favor licensing such places, except in structural fire protection, for accident risks, especially machinery risks, are constantly changing and the creator of these varying industrial dangers should carry the full responsibility for them.

The Manufacturer's Part

1. He can see that the principles of safeguarding and safeworking in his industry are made as much a part of the education of our young engineers at college and young foremen in the plants as are those of efficiency and conservation in other directions. So far I have not heard of a single industrial safety course in any school, college or university in the country. Our engineers are turned out without any preparation in this particular. This one duty of education conscientiously fulfilled is fraught with more good to the industrial community than all the statutes ever penned on the subject. With this provision naturally goes the progressive education of the workmen also. In other words, the State may give valuable help, but it can never *do* the work. We are asking too much from the manufacturer, whereas the manufacturer determined to have all possible "safety" can get it without asking society or "all-of-us" for any assistance whatever.

2. He can place the responsibility for the safeguarding of his plant upon the mechanical engineer; for the secret of repeated preventable accidents in any plant is an open one, viz., that whatever is permitted to be anybody's or everybody's business is in daily life, as we well know, nobody's business. Committees of safety consisting of workmen and foremen may locate accident risks, but the design and installation of well-considered, consistent, durable safeguards need the close attention of a competent engineer. In a matter such as this the attitude and action of the mechanical executive of a factory are all important and give the keynote on safety to the whole plant.

It is because such a source of betterment, constantly operating, has a hundred chances to one over infrequent State inspection for preventing accident, that I desire to see the compelling legal obligation constantly lying upon the employer which has been so successful in the United Kingdom and in Europe.

Efficiency and Industrial Safety

In our industrial States there was a time, not so very distant, when a large proportion of the manufacturers took little or no interest in legislative action affecting labor conditions, and never reckoned with their responsibilities under the labor laws until worried into doing so. At that time, particularly in the less populous parts of these States, they were seldom worried and, in spite of the efforts and oft-repeated recommendations of a few able and zealous labor commissioners, the provision for State enforcement of the labor laws was so inadequate that manufacturers in Philadelphia and elsewhere had difficulty in believing that serious observance had been expected by our legislators. A great deal of our legislation is to dress the store window. It has no effect on the laborer or his employer.

MANUFACTURERS ARE MEETING THEIR OBLIGATIONS

At the present day such matters have greatly changed for the better and to an extent that is hardly realized by a public fed largely upon sensation and responding chiefly to lamentable industrial catastrophes. The best type of manufacturer now looks his legal obligations to labor squarely in the face and plans accordingly. He realizes his moral as well as his statutory responsibilities toward his employees and in many cases exceeds the latter in satisfying his conscience and intelligence regarding the former.

This good work naturally begins at the top, but it still needs a resolute campaign of education and demonstration to permeate the great mass of employers in our villages and large cities with a sense of obligation and an appreciation that the way out is now clearly marked.

But the wave of humanitarian interest, which is on the crest at present and will of course have its variations, is not the only or indeed the chief factor in securing permanent betterment in industrial conditions. A less obvious but none the less real influence is at work behind the scenes which bids fair to make the path smoother for the realization of some labor ideals. The possibilities in improved labor legislation, particularly in hours of labor and safety, are closely allied to and dependent upon improved labor and factory efficiency.

ECONOMIC NECESSITY A FACTOR

Economic necessity, if not inclination, is already driving the manufacturer to take up in all seriousness the conservation and intensive application of human energies in every department af activity, distributive as well as productive. To succeed in this his factory must be safe, clean, well lighted, heated and ventilated and his employees must be willing to be taught how to attain higher efficiency in a shorter working day. The living necessities of a rapidly multiplying urban population leave us no longer any choice as to whether we shall or shall not intensify the industrial arts.

After a period of great abundance and of great waste of natural resources we are now living upon charity, the charity of the farmer and of every living soul whose efficiency can contribute towards reducing the cost of the necessities of life.

Even the farmer must now rely wholly upon the engineer and manufacturer for the tools of his trade which alone make extensive cultivation possible, and upon the chemist and other scientists for the directions which will enable him to intensify his yield as well.

The population question within our own borders will shortly make these steps imperative, and no legislation or political economy which ignores such needs can possibly stand a trial.

Efficiency and Conservation

The modern efficiency movement of which you have heard is far from being a ready-made, stereotyped remedy for every sick business, but it is one with which every manufacturer is bound to reckon. Making all due allowance for extravagant expectations, and there have been such, nothing but good can come to the commonwealth from the wise application of its principles.

Efficiency implies conservation of our vital assets; and the employer's arrangements for reasonable hours of labor, safety, sanitation and compensation are all involved

in the greater efficiency he seeks. The steps he has to take to attain these most desirable ends tax his organization, his skill of management and his capital far more than they do his workmen who are insured increasing leisure and increasing reward for a new type of diligence.

If the stereotyped and unprogressive "trades," some of which have not moved since the Tower of Babel was built, stand in the way they will most certainly block some of labor's highest ideals, and in the long run will suffer self-destruction.

The progressive manufacturer's organization is deliberately directed towards enabling employee and capitalist alike to make more of the opportunities of the working day under efficient shop conditions which satisfy every reasonable aspiration of labor, and which will make it possible to obtain permanently by scientific co-operation a larger measure of leisure for the workman than legal fiat alone could ever secure.

NO QUICK REFORM.

Industrial safety, though a most important item, is only one of a long list awaiting our attention, and neither the iron hand nor a careless generosity will secure improvement. Both are at work, and have failed.

The unsparing exposure during the last ten years of the vulnerable joints in our social armor is certain to continue. It is now re-enforced by our best citizens, and is well organized. The motives behind it in the past have been as various as human nature, but a skilful diagnosis of our social ills is nowadays not seldom accompanied by a practicable prescription.

For the evils that afflict our political and industrial affairs today there will be no sensational remedy forthcoming at Washington or anywhere else. They will yield only to the better administration of, and greater respect for, the laws we have, to a keener sense of justice, to a greater love for the truth about these things, to greater sympathy and—most commonplace of all—to "patient continuance in well-doing."

We must apply our minds to these subjects as well as our emotions and our means, for, whoever may seem to rule in this nation, the thinker is and always will be its master.

Safeguards at the Remington Works

The Remington Typewriter Works include, besides a large amount of stationary equipment, some 1600 machines driven by mechanical power and about 100 operated by manual power. The works use no patented contrivances for safeguarding the employees. Any device exhibited may be freely copied by any person, and any visitors through the works desiring to copy them are given full information as to how to use them.

The safeguards I am going to show you, in all cases except where oil and liquid splash are to be avoided, are uniformly of steel mesh work, reinforced on the edges with sheet steel. A few opaque guards are used, but experience proves that guards are much less likely to be disturbed and laid aside when important working parts of the machinery can be inspected without detaching a guard.

Provision is made in the designing of these guards for the ready detachment, by a person in authority only, of a guard or of any portion of one, for adjustment for repair of machinery. The foundations or supports of these guards are more or less permanent and are usually undisturbed by the necessary removal of accidental parts of the guard. The main point in designing a guard is the study of the real accident risk, when a machine is employed at its ordinary work with the ordinary operators, and then we study to provide a safeguard whose design affords safety, accessibility, machine inspection and durability, and it must not unduly hamper the worker. If possible it should not hamper him at all.

The monthly meeting of the Pittsburgh Foundrymen's Association was held in the Oliver Building, Pittsburgh, on the evening of February 5. William H. Wood of the brass shop of the Pennsylvania Lines West, Pittsburgh, Pa., read a paper on "Brass."

The Perry Iron Company, Erie, Pa., denies a report published in that city that it intends to build a second blast furnace.

Machinery Dealers Act on Tariff Revision

A meeting of dealers in machinery to consider the proposed tariff revision was held February 6 in the office of the Prentiss Tool & Supply Company, 149 Broadway, New York. Henry Prentiss is the first vice-president of the National Supply and Machinery Dealers' Association. The effect of the placing of machine tools on the free list was discussed and declared to be a most unjust proposal. The opinion was expressed that the proposed metal schedule will be amended in this particular when its unfairness is made clear to the Finance Committee of the Senate, which will give a hearing to the machinery interests on Tuesday, February 13, in Washington. The dealers decided to bring the question immediately to the attention of individual members of Congress, especially Senators, by means of letters, and to co-operate in every way with the manufacturers.

An Aliquippa Blast Furnace to Start

The Jones & Laughlin Steel Company, Pittsburgh, will blow in one of its four blast furnaces at Aliquippa, Pa., in about a week. These four stacks have been idle for two or more years.

Correction.—An error was made in the article published on page 285 in *The Iron Age* of January 25 headed "Carl Still By-Product and Benzol Plants." The statement should have been made that Bagley, Mills & Co., Ltd., report that Carl Still of Recklinghausen, Germany, for whom they are agents, is building a number of by-product coke oven plants and benzol plants. Bagley, Mills & Co., Ltd., are representatives for Carl Still and do not build.

The independent tin plate manufacturers of the United States have obtained a Pennsylvania charter under the name of the Association of Sheet and Tin Plate Manufacturers, with headquarters in Pittsburgh. The organization has been formed for the mutual protection of the various independent manufacturers of tin plate in the United States and in a manner not to conflict with the Sherman anti-trust law. The details and names of charter members of the organization were given in *The Iron Age* of December 28, 1911.

An application for a receivership for the American Cement Company has been made by the stockholders, and Sidney W. Keith, Robert W. Lesley and John Scott, Jr., have been named as receivers. The American Cement Company is a New Jersey corporation with $2,100,000 capital stock, and controls nine subsidiary concerns. They are the Lesley-Trindle Company, Reliance Cement Company, North American Portland Cement Company, Norfolk Portland Cement Company, Vindex Land Company and United Building Material Company. The indebtedness of the company is $925,000 and the assets are $1,875,000, which represents the face value of the securities.

The Brier Hill Iron & Steel Company, Youngstown, Ohio, intends to build a steel plant that will produce eventually 2,000 tons of steel per day, but the initial plant will have a capacity of about 1,000 tons per day, and will probably consist of six 80-ton furnaces. The company will build finishing mills to take care of its surplus output of semi-finished steel over and above what will be furnished to affiliated companies. The size of the plant to be built will be definitely decided upon within 10 days or two weeks.

The Engineers' Club, Philadelphia, Pa., held its thirty-third annual meeting February 3. Henry Hess, Hess-Bright Mfg. Company, was elected president; Charles F. Mebus, vice-president; W. Purves Taylor, secretary, and F. H. Stier, treasurer. The following directors were elected to serve for three years: H. C. Berry, B. A. Haldeman, S. M. Swaab and D. Robert Yarnall.

The Machinery Markets

In practically every section of the country there has been in the week just past more or less decline in activity in the machinery markets. There has been a continuance of inquiries to an encouraging extent, although in some directions these, too, have fallen off. A great deal of uneasiness exists in the trade because of the provision in the proposed new tariff schedule which would place machine tools on the free list, which, added to slower trade conditions, does not tend to make either manufacturers or dealers joyful. In New York conditions are quieter than they have been for a couple of months. In Philadelphia business has been light, although inquiry for machine tools is pronounced. New England had a good January, as compared with the preceding two months and the export trade has kept up. The textile machinery business is improving. Prospective business with railroads, which is awaiting the completion of budgets, is holding interest in Chicago, where, it is reported, the Wabash Railroad will expend $100,000 for machine-tool equipment; an improvement is noted in general conditions. In both Cleveland and Cincinnati actual orders have fallen off, although Cleveland reports good business in prospect and a good demand at present for cranes. Detroit conditions are quiet, with competition keen. No special features are reported in the South and Southwest, although industrial conditions are such as to foster trade. In St. Louis there has been a continuance of many small orders. On the Pacific coast the outlook for railroad buying is better, with actual business at present of an encouraging nature. Canadian conditions show a better trend.

New York

NEW YORK, February 7, 1912.

Conditions in the New York machinery market have been more quiet in the last week than they were in the previous few weeks. There has been some scattered buying, but none running into exceptionally large figures and there have been fewer new inquiries. Two or three houses, each of which handles a diversity of lines, are doing a good business and are confident also of realizing to a considerable extent on inquiries now in hand. The tariff question is a much discussed topic in the trade and the cause of uneasiness. Its importance in the eyes of machinery men is indicated by the meeting of the Eastern members of the National Machine Tool Builders' Association in New York this week. Of great encouragement to the trade in New York have been additional inquiries put out by a large manufacturing interest which has been a good buyer in the last few weeks and which is looked to for still further business when a new shop is completed. The Lehigh Coal & Navigation Company has placed orders in the last few days against a small list of long standing and several industrial firms too have been in the market for one or a few tools each. Manufacturers of hoisting machinery and cranes, especially for railroad work, report a fairly good business, particularly for export, and such manufacturers have received an increase in inquiries, many of which will not develop business until spring. Despite all the doubt resulting from political discussion and proposed tariff adjustments the trade is hopeful.

Jaburg Bros., 1 Worth street, New York, manufacturers of bakers' machinery, have had plans prepared for a plant to be erected on a site recently acquired at Stapleton, S. I. The machinery now at the present plant will be moved and much new equipment will have to be provided, including a power plant.

The Waite-Hayden Company, Syracuse, N. Y., has been incorporated to manufacture emergency alarm systems for factories and schools. The company is having plans prepared for a plant which will require machine shop equipment, which will be erected as soon as a suitable site is secured. At present the company's product is being manufactured by contract. W. M. Waite is president and T. B. Hayden, secretary-treasurer of the company.

R. U. Delapenha & Co., Poughkeepsie, N. Y., will erect a four-story and basement factory, 60 x 80 ft., for the manufacture of candied fruits and confections.

The Utica Bedding Factory, Inc., Utica, N. Y., has been incorporated with a capital stock of $50,000 to manufacture bedding, springs, mattresses, etc. H. and S. Gross and J. Markel, Utica, are the incorporators.

The Minetto-Meriden Company, Minetto, N. Y., will build an addition 90 x 99 ft. and two stories to its power house at that place.

The Syracuse Lighting Company, Syracuse, N. Y., is having plans prepared for substations which it contemplates erecting the coming summer at Marcellus, Marcellus Falls, Skaneateles and Skaneateles Junction. M. Pherris is engineer.

The Forsyth Metal Goods Company, Buffalo, N. Y., has been incorporated with a capital stock of $30,000 to take over and continue the business and operate the plant of the Forsyth Mfg. Company, at 308 The Terrace. The line of the company's manufacture, which comprises bathroom fixtures, hardware specialties and bicycle parts, is to be gradually enlarged, but no additional machinery equipment will be installed at present. J. H. Price is president of the company; H. B. Rose, vice-president and manager, and D. N. Whittington, secretary.

The Standard Non-Refillable Bottle Corporation, Buffalo, has been incorporated with a capital stock of $200,000 to manufacture bottles, jars and other containers, and will establish a plant for the purpose. A. F. Bigger, Buffalo; F. Whitacre and J. O. Chapin, Niagara Falls, are the incorporators.

The Universal Varnish Drying System, Inc., Buffalo, has been incorporated with a capital stock of $50,000 to manufacture drying apparatus, etc. I. G. Holender, L. E. R. French and C. H. Taylor are the incorporators.

The Buffalo Crushed Stone Company, Buffalo, is adding a blacksmith shop and a boiler house to its plant at Main street and the Erie Railroad.

The Gray Mfg. Company, Buffalo, has been incorporated with a capital stock of $30,000 and will engage in the manufacture of special machinery, particularly electric motor trucks for serving annealing ovens in malleable iron foundries. The incorporators are I. Gray, B. B. Pannett and E. C. Randall, 615 White Building. Arrangements are being made for establishing a manufacturing plant.

The Cataract Rubber Company, 320 White Building, Buffalo, is having plans prepared for a factory building 125 x 175 ft., one and three stories, of reinforced concrete.

The F. C. LaRue Soap Company, 584-586 Niagara street, Buffalo, recently incorporated to manufacture paste soaps, is in the market for a steam boiler, asbestos covered, tested to 100 lb.; a 40-gal. seamless steam-jacketed boiling kettle and a 2-hp. gas engine.

Catalogues Wanted

Nathaniel Roberts, consulting engineer, Demarest, N. J., wishes to receive catalogues and price lists of mill and machine-shop sundries and supplies.

New England

BOSTON, MASS., February 6, 1912.

The month of January proved to be quite satisfactory to a majority of the dealers and to a large number of manufacturers of machine tools and kindred lines. In a few cases the month was the best for a year back, but as a rule the amount of business transacted was good only by comparison with the dull months which preceded November and December. Foreign business keeps up. In this connection the machinery trade is deeply worried over the action of the House of Representatives in passing the Underwood bill which puts machine tools on the free list. While few manufacturers believe that this bill will become law, they are discussing the possibilities which would follow its enactment. Our foreign trade would not be disturbed but the imports of machine tools would be very largely increased, it is argued, because foreign builders would undoubtedly be able to undersell the Americans, es-

pecially on the cheaper types. The special machinery builders are doing a very good business, especially among the manufacturers of automatics. The textile machinery industry is gradually but certainly improving.

The experience of the E. J. Manville Machine Company, Waterbury, Conn., proves that some lines of equipment have been in strong demand. The company manufactures headers, thread-rolling machines, power presses, wood screw machinery and a large variety of special equipment. The company reports that sales for 1911 were the largest in its history. At present conditions are not so promising, but the management expects that business will be brisk in the spring. Plans are being made for extending manufacturing facilities and a third story will be added to the entire plant.

The dealers have heard nothing to indicate that the New England railroads will send out any lists of machinery in the immediate future. The New York, New Haven & Hartford list for the new roundhouse at New Haven has not been closed at last reports.

The Union Lock-Stitch Company, East Boston, Mass., states that no new equipment will be required in extending the company's line of machinery, as for the present all parts and machine work will be manufactured under contract.

It is announced in New London, Conn., that the Connecticut Turbine Mfg. Company is to establish works in that city. The experimental work on a new steam turbine has been completed and manufacturing will be carried on at the Hopson & Chapin Mfg. Company's plant.

The ninth annual Motor Boat and Engine Show at Mechanics' Building, Boston, last week, had few exhibits of machinery or supplies which go into the manufacture and construction of motor boat equipment. The exhibit of gasoline engines was very large and indicated that the field for this type of motor is increasing with great rapidity. The manufacturers report that they have had a good year and anticipate that 1912 will give them an even greater business.

The Union Mfg. Company, New Britain, Conn., manufacturer of chucks and other metal specialties, has voted to increase its capital stock from $300,000 to $500,000. The new stock will be issued to the stockholders out of the surplus earnings of the company in ratio to their present holdings.

New England is much interested in the coming auction sale at Worcester, February 21, of the various manufacturing plants and property of the Capital Hardware & Woodware Company. Much of this property is in New England. The company owns the works of the S. A. Smith Company, Brattleboro, Vt.; Wilkins Toy Company, Keene, N. H.; R. Bliss Mfg. Company, Pawtucket, R. I.; Jones & Bixler Mfg. Company, Bethlehem, Pa.; Grey Iron Casting Company, Mount Joy, Pa.; F. W. Crandall Mfg. Company, Elkland, Pa.; Gong Bell Mfg. Company, Easthampton, Conn.; J. I. Watrous Mfg. Company, Easthampton, Conn.; E. N. Hill Brass Company, Easthampton, Conn.; J. & E. Stevens Company, Cromwell, Conn.; Kenton Hardware Mfg. Company, Kenton, Ohio; St. Louis Rattan Company, St. Louis, Mo.; Noble & Cooley, Granville, Mass.; Mason & Parker, Winchendon, Mass., and Whitney Reed Chair Company, Leominster, Mass.

The Rangeley Lakes & Megantic Railroad will construct a line from Oquossoc, the present terminus of the Portland & Rangeley division of the Maine Central Railroad, to Kennabago, a distance of ten miles. The work will begin as soon as contracts can be let. It is believed that eventually a line will be continued to Megantic, where connections may be had with the Canadian Pacific. This will give to the Maine Central, the owner of the new line, direct connections from Portland to Quebec.

The Pratt & Cady Company, Hartford, Conn., has voted to increase its capital stock from $400,000 to $500,000.

The Worcester Ornamental Iron Company, 140 Foster street, Worcester, Mass., is planning to lease the buildings owned by the Harris Car Company on Grafton street, which are now vacant. The Ornamental Iron Company manufactures iron and bronze work, and the growth of the business requires larger manufacturing facilities.

The American Brass Company, Waterbury, Conn., has purchased property on Meadow street with the idea of erecting an office building. But the company states no plans for the structure have been drawn nor of producing the wire necessary in the manufacture of the insulated product.

Additions to general manufacturing plants in New England include the following: Henry Weyan Comis it contemplated to carry out the project in the near future.

The Acme Wire Company, Whitney avenue, New Haven, Conn., is erecting a machine shop, 20 x 30 ft., one story.

The Beaton & Corbin Mfg. Company, Southington, Conn., will erect a brick addition, 36 x 78 ft., two stories and basement.

The National India Rubber Company, Bristol, R. I., will establish a wire mill of its own with the purpose pany, Waterbury, Conn., additions to shop and office; Carlson & Koletzsky, New Haven, Conn., two-story building, 25 x 72 ft.; Killingly Mfg. Company, to expend $500,000 in improvements to the plant of the Williamsville Mfg. Company, Williamsville, Conn.; Interlaken Mills Company, Harris, R. I., a large weave shed; Touraine Company, lace manufacturer, New Hartford, Conn., one-story building, 56 x 250 ft.; Draycott Mills Company, New Hartford, Conn., large brick mill.

Beaudry & Co., Inc., 141 Milk street, Boston, Mass., have brought out a new type of power hammer known as the Peerless, which will be made in sizes from 25 to 200 lb. This is a manufacturing machine, as distinguishing it from the company's Champion type, the scope of the operation of which is much broader. Both machines have as a characteristic their working parts of steel throughout. The ram is a steel casting connected with spring arms by means of long links, giving a maximum lift of ram and imparting through the spring arms a very elastic and powerful blow.

Philadelphia

PHILADELPHIA, PA., February 6, 1912.

The past month's business has been very spotty and the average in most cases has been below rather than above that for the previous month. A few builders of tools booked a slightly better volume of business. Machinery merchants as well as manufacturers continue to report business as irregular; transactions have been largely in single tools, those of lathes and drills being the most general, with an occasional boring mill, milling machine or a grinder. Some of the pending crane business has been closed, although several installations are still under negotiation. Railroad buying is still confined to occasional small purchases, with no important inquiry. In machine tools some single tool business is pending, as are several small projects, with a few fair sized propositions in sight, which are expected to develop into inquiries in the near future. A moderate volume of inquiry for boilers, engines and pumps is noted; a few orders have been placed but as a rule contracts close slowly. The second hand machinery market shows but little improvement; buying has been confined to single tools and general equipment, with new business developing rather irregularly. The foundry trade, particularly that involving the manufacture of machinery castings, continues quiet. Steel casting plants continue to operate on a very much restricted basis and report inquiries as being lighter. In some of the general gray iron foundries a slightly better melt is reported, although business is still far below normal.

The Pennsylvania Railroad has an inquiry out for a 24 and a 28-in. drill press.

The Rcme Motor Mfg. Company has been incorporated under New Jersey laws with a capital stock of $500,000 and will engage in the manufacture of automobiles, cars and wagons. The company will take over the Rowe Motor Company, Coatesville, Pa., manufacturer of motors, and will materially increase the capacity of the plant, plans for which are now under consideration.

The Ford Chain Block Company has moved to its recently acquired plant at 139-141 Oxford street, which will enable it to increase its capacity from two to threefold. Some additional general machinery has been installed and the company is in the market for several lathes of the engine and turret types, gear cutters and general machinery. These tools are all to be belt driven. It reports business as being exceptionally good.

Ballenger & Perrot are preparing preliminary plans for an eight-story loft building 100 ft. square, to be erected for I. H. & L. Goodman at 1324 to 1334 Race street. A reinforced concrete building of fireproof construction is being considered.

The General Engineering Company will shortly begin the erection of a concrete factory building 148 x 157 ft., at Front and Kenilworth streets, which will be used for the manufacture of automobile supplies and

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURG

shop equipment. While considerable machinery equipment will be required for the new plant, the company advises it will not be prepared to consider such purchases for several months.

The Victor Talking Machine Company, Camden, N. J., is having plans prepared by Ballinger & Perrot for a five-story addition to one of its buildings. The addition is to be of brick and steel, 90 x 175 ft. Electric lighting and steam heating is included. It will be used for general manufacturing purposes.

The Root Dairy Supply Company, West Grove, Pa., has let the contract for a portion of its new plant to be erected on a part of the site purchased in Chester, Pa., which was formerly occupied by the Economy Iron Works at Sixth and Lloyd streets. The principal building will be three stories, 60 x 160 ft. Operations on the new plant will be started as soon as weather permits and it is expected to be ready for occupancy in the spring.

Peuckert & Wunder, engineers and architects, are taking bids on a new power plant and engine house 40 x 50 ft., two stories, for the Reading Brewing Company, Reading, Pa. Orders have been placed with the Link-Belt Company for the necessary coal handling machinery, while contracts for two 300-hp. Wickes boilers have also been placed. Some smaller equipment will probably be required but has not yet been decided on.

The Ebert Furniture Company will erect a three-story addition, 30 x 116 ft., to its plant at Sixth and Moore streets, but advises that it will not be in the market for any additional machinery or equipment.

Considerable preliminary work is under way by the Pennsylvania Railroad Company in connection with various improvements to its system in this city. While official information is lacking numerous conferences with city officials are noted. The company is now having plans prepared for the erection of its new 1,000,000-bushel grain elevator to be built in this city.

Chicago

CHICAGO, ILL., February 6, 1912.

Reports of further financing by Western railroads are of interest to machine tool builders and dealers in this territory. Budgets for 1912 are assuming definite shape in several instances. In the refinancing plan for the Wabash Railroad an expenditure of $100,000 for machine tools is contemplated. An improvement in the general demand for machinery is noted and inquiries directed to machine tool manufacturers regarding their plant operations show a net increase in output during the past 60 days as compared with the previous period. An interesting increase in sales of turret lathes and automatic machinery throughout Mississippi Valley territory is noted. At the automobile exhibit of pleasure cars held in this city during the past week expectations of heavy sales were more than realized. One company reports orders for nearly 1500 machines, or nearly twice the show sales of the previous year. The year promises to be another one of capacity-taxing output for this industry.

C. P. Kimball & Co., Chicago, will begin at once the erection of a steel and concrete building for the manufacture and sale of automobile bodies. The building will be located at Thirty-ninth street and Michigan avenue and will cost $300,000.

The Chain Belt Company, Milwaukee, Wis., has opened a Chicago office in the Old Colony Building, 84 Van Buren street, in charge of B. S. Reynolds, who has been associated with the engineering department of the company.

The Whitney Metal Tool Company, Chicago, announces an increase in its capital stock from $20,000 to $50,000 and of its directors from three to five.

The Bentley-Snyder Company, steel founder, announces an increase in its capital stock from $50,000 to $100,000.

The Cyclone Fence Company, Waukegan, Ill., announces through its president, J. P. Arthur, that it is completing plans for the erection of a new factory to cost about $100,000.

Matherville Light & Power Company, Matherville, Ill., has been incorporated with a capital stock of $10,000 by Paul Wagner, J. W. Walsh, John J. Ryan, H. C. Lightner and W. W. McCullough to do a general electric light and power business.

The Illinois Steel Bridge Company, Jacksonville, Ill., is building an addition to its plant, 40 x 64 ft., to be used for the making of corrugated galvanized steel culverts.

The Rudolph Mfg. Company, Roselle, Ill., has leased a factory at Elgin, formerly occupied by the Elgin Metal Novelty Company, and will transfer its business at once to Elgin to be conducted on a larger scale.

The Duplex Motor Plow Company, Chicago, Henry C. Hascall, president, has leased the plant of the Taylor Husker Company, Joliet, Ill., and will install such additional machinery as is necessary for the manufacture of a duplex motor plow.

The Illinois Cutlery Company, Blue Island, Ill., has arranged to move its plant to Belvidere, where factory buildings have already been secured.

The Specialty Brass Company, Pleasant Prairie, Wis., has been incorporated by Henry Anderson, John Anderson and Lars C. Thomsen with a capital stock of $25,000.

The Hartman-Greiling Company, Green Bay, Wis., boilermaker and machinist, has been incorporated with a capital stock of $75,000 by Carl Hartman, Herman Greiling, Charles Greiling and L. H. Barckhausen.

The Racine Electric Company, Racine, Wis., recently incorporated with $10,000 capital stock, is buying machinery for the equipment of its factory building for manufacturing electrical appliances.

The Weyenberg Shoe Company, Milwaukee, Wis., is having plans prepared for an addition to its factory at 121 Harmon street. The new building will be five stories, 50 x 120 ft. The cost of erection is estimated at $50,000.

D. D. Langton, Des Moines, Iowa, is about to erect at a cost of $20,000 a new factory for the manufacture of wood veneer.

The city of Vinton, Iowa, is planning for the erection of a new power house this spring, for which plans are now being drawn. The new plant is estimated to cost $20,000 and will be a part of both the light and water systems.

The Marshalltown Trowel Company, Marshalltown, Iowa, will begin March 1 the construction of a new building, 50 x 100 ft., for housing its rolling, forging and blacksmith departments. Among the new equipment required for this building will be four oil furnaces and at least two additional blanking presses.

The Fisher Governor Company, Marshalltown, Iowa, is planning to let contracts early in the spring for an addition to its machine shop. In this department new automatic machine equipment will be installed.

The Waterloo Drop Forge Company Waterloo, Iowa, plant was destroyed by fire January 30, entailing a loss estimated at $75,000.

The New Hampton Mfg. Company, New Hampton, Iowa, is to be removed to Sioux City, where a new plant, 50 x 100 ft., is being erected. This company is a builder of gas engines.

The R. C. Leedham Engine & Mfg. Company, Trinidad, Col., has been incorporated with an authorized capital stock of $50,000, by R. C. Leedham, H. Skuyler, Jr., R. M. Calley and T. M. Maxwell.

Cincinnati

CINCINNATI, OHIO, February 6, 1912.

The machine tool trade appears to be easing off again this week, but in a measure this can be attributed to the intensely cold weather with which the week opened. Local tool builders, regardless of politics, are more interested in the tariff question just now than anything else. The majority of those who are conversant with conditions abroad state that a removal of the present duty will work great damage to the machine tool business of the country.

Second-hand machinery of all kinds is quiet and new wood working machinery is ony in fairly good demand, but an improvement in both is looked for at the opening of the spring season.

The foundry situation is unchanged, with probably the jobbing foundries operating to about 60 per cent. of capacity.

The regular annual meeting of the Cincinnati branch, National Metal Trades Association, will be held at the Business Men's Club on the evening of March 6. The election of officers will take place, after which a banquet will be served; the names of the speakers have not yet been given out.

It is reported that an agreement has been reached between the creditors and trustees of the Platt Iron Works Company, Dayton, Ohio, and that the plant will be offered at a public sale March 7, and the company reorganized.

Work of installing the equipment in the Modern Machine Tool Company's plant at Winton place, Cincinnati, is progressing satisfactorily, and the plant is expected to be in operation by the opening of the spring season.

The Mitchell-Conner Mfg. Company is a new Cincinnati incorporation with $25,000 capital stock. A large site has been secured at the corner of Reading road and Dorchester street, on which is now being erected a temporary plant to manufacture the Mitchell reversible window device, and later on a much larger building will be put up. Dr. A. Reed Conner, Lincoln Inn Court Building, is president of the new company.

The Director of Public Service, Cincinnati, will open bids March 4 for the sale of the waterworks and electric lighting plant of Madisonville, Ohio, a Cincinati suburb.

The Edgemont Machine Company, Dayton, Ohio, has had plans prepared for a two-story factory building to be erected at Mound and Washington streets.

The Ironton Punch & Shear Company, Ironton, Ohio, has increased its capital stock from $30,000 to $75,000, and it is reported some extensive additions will be made to its plant. Several months ago this company purchased the equipment of the Cincinnati Punch & Shear Company and moved it to Ironton.

The Jewel Carriage Company, Carthage, Ohio, will probably build a large branch plant at some point in Canada.

The Pinson Fork Coal Company, Huntington, W. Va., has been incorporated with $100,000 capital stock to mine coal and manufacture coke. Among the incorporators are A. E. Bush, E. M. Watts and others.

It is rumored that some extensions will be made to the plant of the Coshocton Light & Heating Company, Coshocton, Ohio. A controlling interest in this plant was recently acquired by Brooks & Co., Scranton, Pa.

Hamilton

HAMILTON, OHIO, February 5, 1912.

The Hamilton Chamber of Commerce on February 2 signed contracts for the location in Hamilton of the Anderson Tool Company, Anderson, Ind., whose plant was destroyed by fire on the night of January 26. The company will change its name to the American Scale & Tank Company and its line will in future be known as the Hamilton system. Its new home will be in the extensive properties erected some years ago by the MacNeale & Urban Safe Company and more recently occupied by the Carriage Woodwork Company. This property includes 80,000 ft. of floor space and occupies upward of three acres of ground, advantageously located for manufacturing purposes. Extensive improvements will be immediately made and a model plant speedily developed. The new enterprise is the most important located in Hamilton for many years. The company is employing in all departments about 600 men and reports a rapid expansion of business. It manufactures a complete line of computing scales and automatic oil tanks. Negotiations for its location in Hamilton were conducted between the industrial committee of the Chamber of Commerce and B. D. Emanuel, treasurer of the Anderson Tool Company. The actual manufacture of the company's product in its new home has already begun.

The Sterling Paper Company officially confirms rumors that it will expend from $150,000 to $175,000 in additions to its Hamilton mill the coming spring. Three buildings are to be erected—a 5-story concrete stock house, a 1-story concrete machine room and a 1-story concrete finishing room. A new 136-in. machine is to be installed, and the company, which is now devoting itself to the manufacture of high-grade wax and book papers, will add ledger papers and a general line of high-class stock.

The Herring-Hall-Marvin Safe Company has increased its capital stock from $700,000 to $1,400,000 by the issue of new 7 per cent. cumulative preferred stock. The stockholders will ratify this proposition at the annual meeting February 8. Considerable enlargement of the company's activities will follow.

The Hamilton Caster Mfg. Company announces that it will soon begin the manufacture of a new patented water motor washing machine which does away with all springs, gears, racks and belting. The new device will be known as the Magic Motor. The company expects to market this machine on a large scale and will pay particular attention to the foreign trade, which in the past has been neglected by all manufacturers owing to the difficulty in securing repair parts abroad. The machines will be placed on the market before March 1.

At the annual election of the Hooven-Owens-Rentschler Company held January 29 the former officers and directors were re-elected as follows: J. C. Hooven, president; G. A. Rentschler, vice-president; W. B. Mayo, secretary and general manager; Henry Sohn, treasurer; C. E. Hooven, assistant treasurer; G. H. Helvy, J. G. Schmidlapp and A. B. Voorheis of Cincinnati, directors. This company reports increasing inquiries and a general strengthening of business since January 1.

Cullen & Vaughn, general contractors, report a contract from Shuler & Benninghofen, Hamilton, manufacturers of woolen felts, for the construction of buildings to be used for a new power plant.

The regular annual meeting of the stockholders of the Niles Tool Works Company, Hamilton, Ohio, was held January 30. The following officers were re-elected: President, James K. Cullen; vice-president, George T. Reiss; secretary, James L. Blair; assistant secretary, Miles T. Watts; treasurer, Charles Cornell, and assistant treasurer, Lucius B. Potter.

The Hamilton-Otto Coke Company, Hamilton, Ohio, has organized by electing the following officers: S. M. Goodman, president; F. S. Garrison, vice-president; W. A. Eberson, secretary and treasurer.

Cleveland

CLEVELAND, OHIO, February 6, 1912.

Orders for machine tools received by dealers during the week were light. One seller sold one lot of about 10 small sized tools, but with that exception orders were mostly for single tools, a large share of these being for second hand machines. Some fairly good business that is in prospect is rather slow in being placed. Considerable work in new plants and plant extensions is in prospect in this city in metal working lines, which is expected to result in the buying of machinery during the spring. Reports from local machine tool builders indicate a little improvement in the volume of orders. The demand for cranes for manufacturing plants has improved considerably since the first of the year.

In the foundry trade there is an improved demand for machinery castings and buyers who have been placing orders for small lots seem more disposed to contract for extended delivery. In the general gray iron foundry jobbing trade conditions show little change, the volume of orders being moderate.

Calvin W. Rice, secretary of the American Society for Mechanical Engineers, was in Cleveland February 1 to discuss with members of the Cleveland Engineering Society plans for the next spring meeting of the American Society to be held in Cleveland June 4 to 7, inclusive. Mr. Rice with members of the local society was entertained at a dinner given at the Chamber of Commerce by Ambrose Swasey, of the Warner & Swasey Company. Mr. Swasey was named chairman of the committee to make arrangements for the convention. F. W. Ballard, secretary of the Cleveland Engineering Society, was appointed secretary.

At a meeting of the Cleveland branch of the National Metal Trades Association held February 2 it was decided to hold the annual meeting and banquet of the branch March 7. The meeting will probably be held at the Chamber of Commerce Auditorium. Committees were appointed to make the necessary arrangements.

The Neil Machinery Company has opened a machinery store and sales rooms at 711-713 St. Clair avenue, Cleveland. This company is under the management of George E. Neil, who had offices as a machinery dealer in the New England Building. Mr. Neil will be manager of the company, which will carry in stock a line of Springfield Machine Tool Company's lathes and shapers, Oliver pattern making machines and a general line of machine tools.

The Canton Foundry & Machine Company, Canton, Ohio, is preparing plans for an addition to its machine shop. A new building 50 x 150 ft. will be erected. It will be equipped with a traveling crane. The company reports that it is receiving orders in excess of its manufacturing facilities and that it is necessary to provide capacity for a greater output.

The Cleveland Castings Pattern Company, Cleveland, Ohio, reports its volume of orders about double those it was receiving at this time a year ago. This company has a large amount of work on hand both in machinery patterns and patterns for steam and hot water boilers and radiators.

The Cleveland Metal Products Company, Cleveland, Ohio, has increased its capital stock from $200,000 to $1,000,000. It expects to enlarge its plant in the near future.

The preparing of plans for a new municipal lighting plant in Cleveland, for which an expenditure of $2,000,000 has been authorized, has been started by F. W. Ballard, engineer in charge. According to the present plans about $500,000 will be expended for equipment which will probably be bought during the spring.

Through the efforts of the Akron, Ohio, Chamber of Commerce a new automobile plant is planned for that city. The Ideal Commercial Car Company, now located in Detroit, is negotiating for the location of its plant in that city. A company is being formed with a capital stock of $200,000.

Simeon N. Schact and John G. Schact, Elkhart, Ind., expect shortly to begin the building of a foundry in that city.

It is reported from Alliance, Ohio, that the Stark Electric power house at Lake Park will be greatly enlarged. According to reported plans this power house will furnish electricity for the running of cars on the Cleveland, Alliance & Mahoning Valley electric lines between Alliance and Cleveland.

The Republic Rubber Company, Youngstown, Ohio, will shortly begin the erection of a new five-story addition to its main plant. The building will be of brick and steel construction and will be 80 x 400 ft. The Reaugh Construction Company, Cleveland, Ohio, has the contract for the building.

Frank Marquis, trustee for the Mansfield Rubber Company, has sold the plant of that company to attorney Jesse D. LaDow, who is acting in behalf of a syndicate composed mostly of local men. A reorganization of the company is planned with a capital stock of $300,000.

The Beiderman Mfg. Company, Lima, Ohio, is preparing plans for the erection of a one-story brick or cement manufacturing plant. The building will be 60 x 132 ft. and will be used for the manufacture of kitchen cabinets and office furniture.

The Union Boiler Works Company, Toledo, Ohio, has been organized with a capital stock of $100,000. The incorporators are J. Mason Youngs, Edward Radbone, I. Allen Coby, U. S. G. Deaton, W. Findlay Radbone.

City Engineer Crayton, Lima, Ohio, has received instructions to prepare plans for water and sewerage plants for that city.

It is reported from Urbana, Ohio, that the North American Chemical Company, now located in Rome, Ga., will move to Urbana and build a new plant.

Detroit

DETROIT, MICH., February 6, 1912.

The local machine tool market is still rather quiet and the volume of business placed the past week has been only moderate. Inquiries are perhaps more encouraging, but business closes slowly and there is keen competition. Floor sales are few and are confined almost exclusively to single tools of the smaller type. Some good business is being done by builders of special equipment for automobile plants, but outside of this the motor car interests are keeping out of the market. Makers of sheet metal stampings are getting an improved run of orders. Manufacturers of brass goods, such as brass and copper sheets and tubes, are pleased with the outlook and expect to operate their plants at better capacity. The demand for second-hand tools is not very active and the buying is of a miscellaneous character. Building conditions continue quiet, the unfavorable weather retarding outside work to a great degree.

The Marsh Automatic Soda Fountain Company has been incorporated with $50,000 capital stock to manufacture soda fountains and accessories. R. G. Marsh, J. R. Long and E. C. Mittleberger are the incorporators.

The Detroit Creamery Company has begun work on a three-story brick addition to its plant at Adams and Clifford streets. The new building with its mechanical equipment will give the company a capacity two-thirds greater than it now has.

The Tessmer Machine & Tool Company, manufacturing machinist, has increased its capital stock from $10,000 to $20,000. The new capital will be devoted to enlarging the business.

The T. F. C. Mfg. Company has been incorporated with a capital stock of $30,000 by C. R. Cracy, R. E. Farr and others. The new company will manufacture engine starters and other automobile accessories.

The Hupp Corporation, manufacturer of automobiles, has filed notice of an increase of capital stock from $800,000 to $1,000,000.

The Krause Mfg. Company has been incorporated with a capital stock of $40,000 by James F. Lebig, W. R. Anderson and George P. Good. The company will engage in the manufacture of machinery, mechanical appliances and tools.

The Miller Car Company has been incorporated with $50,000 capital stock to manufacture automobiles. Theodore Miller is the principal stockholder.

The Detroit Cast Block Stone Company has been organized by Paul, Edward L. and Alexander Zagelmayer to manufacture cement blocks and other cement products. The capital stock of the new company is $18,000.

The Gabriel Reinforcement Company has been incorporated with $20,000 capital stock to manufacture concrete reinforcement specialties. The incorporators are William DeLange, George M. Braun and Arthur Gabriel.

The Locomotive Equipment Company has been incorporated with a capital stock of $350,000 and will engage in the manufacture of a new type of journal box, a new driving box for engines and a patent superheater for engines. The new company has offices at 416 Buhl Block and among those interested are Charles R. Richardson, Edward Smith and John A. Ott.

The Brownwall Engine & Pulley Company, Lansing, Mich., has been incorporated with $25,000 capital stock and will manufacture gasoline engines and governor pulleys. The incorporators are Homer D. Parker, E. A. Brown and F. A. Wall. The company has already established a plant and will probably need no equipment at present.

The Niles Cable & Mfg. Company, Niles, Mich., at its annual meeting, elected W. F. Harrah president and M. G. Mitchell vice-president. The company has installed a new department for the manufacture of tempered steel wire braid.

The Munro Iron Mining Company, Iron River, Mich., has awarded contracts to the Warner-Allen Company, Milwaukee, Wis., for the erection at its Rogers mine, of a boiler house, engine house, machine shops, warehouse, dry house, shaft house, crusher and a steel ore bin. Work will be begun March 1 and a considerable amount of mechanical equipment will be required.

The Metal Sign Board Company, Kalamazoo, Mich., has acquired a new factory and it is reported will increase its capacity. J. W. Caywood is secretary.

Anthony Secor, Dowagiac, Mich., will erect a flouring mill in that city. Consideration of the purchase of machinery is now being given.

It is reported that the Malleable Foundry Company, Benton Harbor, Mich., will expend $10,000 for new buildings and improvements at its plant.

The city of Muskegon, Mich., will receive bids until February 12 for three boilers of 150 to 200 hp. capacity and of the tubular pattern for the municipal pumping plant. Address the mayor.

The Pontiac Wheel Company, Pontiac, Mich., maker of carriage wheels, has been declared bankrupt and Frank G. Jacobs appointed receiver. A plan is on foot to reorganize the company and equip the factory for the manufacture of automobile wheels.

Indianapolis

INDIANAPOLIS, IND., February 6, 1912.

The General Industrial & Mfg. Company, Indianapolis, has been incorporated with $1,000,000 capital stock to manufacture automobiles and motor trucks. The company will occupy the former power building at Tenth street and the canal, which is four stories and has 360,000 sq. ft. of floor space. The directors are T. B. Laycock, C. E. Coffin, W. J. Mooney, I. N. Ritchie, of Indianapolis, and E. W. Bowen, of Lebanon, Ind. J. F Lindley is secretary of the company.

The Hammond Brass Works, Hammond, Ind., has been incorporated with $35,000 capital stock to manufacture brass valves and other articles. The directors are C. H. Mayer, J. E. Brennan, W. Wolter, J. F. Lammering and U. G. Cassady.

Jacob M. Bauer and other manufacturers of Greendale, a suburb of Lawrenceburg, Ind., are considering a plan to establish an independent electric light and waterworks plant.

The Anderson Tool Company, Anderson, Ind., whose plant was burned recently, causing $100,000 loss, has signed a contract to rebuild at Hamilton, Ohio, where it can get to work promptly filling its contracts.

The M. Rumely Company, Laporte, Ind., will make an addition to its paint shop, 30 x 70 ft., and will erect another paint shop, 32 x 224 ft. It will also build a storage house, 60 x 200 ft., three stories. A receiving room, 60 x 100 ft., will be connected with the storage

building and will be equipped with a crane. The storage building will have trolley and industrial tracks.

The Indiana Canning Company, Evansville, Ind., has let contracts for the erection of a new plant 60 x 270 ft. The building will be of steel and concrete construction and will cost $20,000.

The South

LOUISVILLE, KY., February 6, 1912.

Business has been moving along at about the same pace as heretofore noted, no especially new features having developed during the past week. There is a general report that plenty of work is in the market, and if contracts are let on all the jobs which are being bid upon there will be plenty of business for the machinery interests. Southern industrial conditions are reported to be satisfactory, so that there is a good foundation for business to build on.

Fitzpatrick & Hoepfner, Columbus, Ohio, who have the general contract for furnishing the equipment for the new city hospital plant of Louisville, have not yet made arrangements for the machinery and are getting bids from manufacturers on all of the equipment involved. It is expected that the announcement of those who will furnish the machinery will be made this week.

What is regarded as a significant announcement was made last week by the Mengel Box Company, Louisville, one of the largest wooden box manufacturers in the country. The company is having plans drawn for an addition to its local factory which will be used for the manufacture of corrugated paper boxes. Machinery will be bought for this in the near future. T. S. Hamilton, mechanical engineer of the company, is in charge of plans for the building and machinery.

The Frederick-Ruggles Mfg. Company, Louisville, which manufactures a patented measuring device, has increased its capital stock and is enlarging its plant. It has put in a Foster lathe, sold by Manning, Maxwell & Moore, New York, and some electroplating equipment of Frederick C. Stevens, Detroit. The company has enlarged its brass foundry and removed it to 107 North Wenzel street, where larger quarters have been secured. Two larger furnaces have been added.

The Louisville Brick Company, Joseph Nevin, manager, has completed plans for enlarging its capacity. The output of the company will be increased from 40,000 to 100,000 bricks a day. The company will require additional dryers, presses, etc., as well as steam tunnels and kilns. The changes will be completed before the opening of the next building season.

Announcement has been made by the Southern National Life Insurance Company, Louisville, that it will erect a 20-story office building at the southeast corner of Fourth and Market streets, a 99-year lease on the property having been secured. The building will be erected by the Southern National Life Realty Company, which has been incorporated with $200,000 capital stock. The cost of the structure will be about $500,000. Ed. L. Williams, president of the insurance company, said that the architect for the building has not yet been selected.

The Louisville Veneers Mills has decided to substitute electricity for steam in the operation of its plant and will be in the market for motors and other electrical equipment. Current will be secured from a local central station.

Stockholders of the Cumberland Telephone & Telegraph Company, meeting in Louisville last week, voted in favor of a bond issue of $15,000,000, the proceeds of which will be used to make improvements in the properties of the company all over the South. The main office of the company is in Nashville, Tenn.

The General Council of Lexington, Ky., is planning the purchase of a rock crusher for use at the city workhouse. The jail committee is in charge of the purchase, which it is expected will require $6,000.

The Eagle Casting Company, Winchester, Ky., has been reorganized through the purchase of C. E. Gibbens of a controlling interest in the company. He becomes president, while F. G. Cornell remains manager of the plant.

The Nicholason Coal Company, Middlesboro, Ky., has increased its capital stock from $60,000 to $120,000 and will install a modern coal-washing plant at a cost of $15,000. Other improvements are also contemplated. F. D. Hart is vice-president and general manager of the company.

Hubert D. Graham, Bowling Green, Ky., plans to develop a deposit of white limestone and will probably organize a quarry company in the near future.

McClaid & Armstrong, Hopkinsville, Ky., are erecting a monument plant and will be in the market for machinery, including a crane, an air compressor plant, power equipment, etc.

The Midway Ice & Supply Company, Midway, Ky., has been organized and will erect an ice factory in the immediate future. Vernon Sutton is secretary and manager of the company.

The general council of Lexington, Ky., has approved an appropriation of $18,000 for the city warehouse, which will involve the purchase of conveying machinery, etc.

The F. S. Ashbrook Distillery Company, Cynthiana, Ky., will move its plant to another point having more favorable freight rates. R. V. Bishop is manager of the company.

The Vaso Company, Henderson, Ky., has increased its capital stock to $50,000. It has leased a building and will install machinery for the manufacture of a patented medicinal preparation.

Angus Wilmot, Frank Wiseman, L. Richardson and Ribert Wilmot, Rineyville, Ky., will erect a flour mill with a capacity of 100 barrels a day. The mill is to be located near Elizabethtown, Ky.

It is reported that the Kentucky & Illinois Bridge Company is being formed for the purpose of building a $1,500,000 bridge across the Ohio River at Paducah, Ky. The cost of the bridge will be shared by the Frisco, Louisville & Nashville, Illinois Central and Burlington. Engineers are now making surveys preliminary to the beginning of work in the immediate future.

The Kentucky Traction & Terminal Company, Lexington, Ky., has let a contract for the erection of a substation near Frankfort, Ky. The main power house of the company is now being built in Lexington.

J. B. Boyd, Allensville, Ky., plans to establish a machine shop and wood-working plant. The proposed expenditure is about $6,000.

It is reported that the Federal Finance & Construction Company, Baltimore, Md., chartered with $100,000 capital stock, will erect a cement plant in Kentucky. William L. Haworth, Baltimore, is secretary of the company.

The Forest Products Chemical Company, Memphis, Tenn., organized with $100,000 capital stock for the purpose of utilizing by a process of destructive distillation by-products of lumber mills, will erect its plant at once. Some contracts have been let, but the main equipment, including boilers and special machinery, is yet to be purchased. James Lawrence is president of the company.

The Nyberg Auto Works, Chattanooga, Tenn., has been incorporated with $100,000 capital stock by Henry Nyberg, Z. C. Patten, C. E. James and others.

The Greeneville Chair Company, Greenevile, Tenn., has announced plans for the erection of a large addition, work upon which will be begun in the near future.

The Fayetteville Tanning & Mfg. Company, Fayetteville, Tenn., has been incorporated with a capital stock of $25,000. The incorporators are D. C. Sherrill, B. E. Holman, W. L. Hatcher and others.

Thomas A. Miller is organizing a $500,000 company in Nashville, Tenn., for the establishment of a cotton mill. The Nashville Industrial Bureau is assisting in the organization of the company.

The Southern Foundry & Machine Company, Lexington, Tenn., has been incorporated with $10,000 capital stock by A. E. Beasley, C. G. Gathings, T. A. Lancaster, W. H. Lancaster and others.

The Birmingham, Montgomery & Gulf Power Company plans the development of the water power on the Tallapoosa River at Cherokee Bluffs, near Alexander City, Ala., at a cost of several millions. Charles H. Baker, of New York, is promoting the enterprise. Thirty thousand hp. will be developed.

A new pumping station will probably be erected by the water commissioners of Huntsville, Ala.

J. Q. Baker and H. R. Campbell, Andrews, N. C., are interested in the erection of a pulp mill of large capacity. The exact location of the plant has not been determined.

The Rocky Mount Machine Works, Rocky Mount, N. C., has been incorporated with $50,000 capital stock by L. F. Pearsall, S. F. Jenkins and T. P. Jenkins.

The Taylor Motor Company, Lynchburg, Va., is in the market for machine shop equipment, including a lathe, drill press, air compressor and traveling crane.

The Birmingham Metal Products Company, Birmingham, Ala., which has been organized with $35,000 capital stock by Solon Jacobs, J. H. Dean and others for the manufacture of a patented corrugated iron culvert, has leased a building and plans to begin manufacturing immediately.

The Gibbes Machinery Company, Columbia, S. C., the plant of which was recently burned, will rebuild im-

mediately and is inquiring for prices on equipment. Automobile parts are to be manufactured.

The Greenville Mill & Elevator Company, Greenville, Miss., will erect a grain elevator with 15,000 bushels capacity. C. P. Williams and others are interested in the company, which is now being organized.

The Dowling Engine Company, Biloxi, Miss., has been incorporated for the purpose of manufacturing gasoline engines. W. K. M. Dukate, Lee Elder, R. B. Dacey and others are interested.

St. Louis

ST. LOUIS, MO., February 5, 1912.

The inquiry is still for single machine tools, but as heretofore the aggregate is running into figures that are interesting. Dealers maintain their optimistic feeling, and reports coming in from the St. Louis trade territory indicate that they are justified therein. There is some movement of second-hand tools, but it is not yet up to the point to indicate any exceptional conditions. Generally the trade is well satisfied with the situation in the light of recent past experience.

The elevator manufacturing plant of the William A. Miller Elevator Company, St. Louis, was burned February 2, almost destroying the entire equipment, as well as the building. The loss is $35,000.

The Standard Patent Candle Company, Cape Town, South Africa, has opened negotiations for the construction and equipment of a branch American plant at St. Louis for the manufacture of its product and also for the mechanical refinement of wax, etc.

The Webb Motor Fire Apparatus Company, St. Louis, has been awarded the contract to supply two automobile fire pumps and trucks to the Panama Canal Commission for the Isthmus fire department.

The old location of the Fulton Iron Works, St. Louis, which is removing to a new plant being constructed on the western edge of the city, has been sold to the Burlington Railroad for team track freight purposes. The iron works expects to complete its plant and get it into operation about the middle of March at the latest.

The United Drug Company, Boston, Mass., has completed its plans for the establishment in St. Louis of a large manufacturing plant, requiring about 300,000 ft. of floor space and considerable mechanical equipment.

The removal of a Kansas City company, capitalized at $200,000, and a heavy user of scrap material, which it converts into pig metal for sale to foundries, is announced. The name is withheld as a merger with a St. Louis firm is under negotiation.

The Rosenthal Paper Company, which has leased a five-story building in St. Louis for the extension of its business and reconverting plant, will soon be in the market for considerable mechanical and electrical equipment, heating apparatus and elevators.

The Bolz-McBride Cooperage Company, St. Louis, has increased its capital stock from $40,000 to $50,000 for the purpose of increasing its mechanical equipment and factory capacity.

The Universal Motor Truck Traction Company, St. Louis, has been incorporated with $250,000 capital stock. The incorporators are W. H. Taylor, John Beltram and A. R. Shaffer. The company will build and equip a motor manufacturing plant.

The Sanitary Paper Cup & Specialty Company, St. Louis, with $40,000 capital stock, has been organized by A. M. Pareira, Sidney Wilson, P. H. Baker, W. V. Scholz, C. M. Diel and E. E. Rauh to equip a plant for the manufacture of sanitary cups and specialties.

The Winter Bros. Laundry Company, Kansas City, Mo., has been incorporated with $15,000 capital stock by A. E. and D. T. Winter, W. C. Willits and F. A. Haas and is in the market for laundry machinery.

The G. M. Mining Company, Carthage, Mo., with $50,000 capital stock, organized by H. G. Glenn, E. M. Murphy and W. H. Waters, Jr., is in the market for zinc mining equipment.

The Illinois School Furniture Company, Rockford, Ill., has been organized with $35,000 capital stock by J. W. Eskholme, J. Martin and W. E. Shirra, and will equip a plant for the manufacture of school furniture.

The Gross Bros. Mfg. Company, Galesburg, Ill., has been incorporated with $100,000 capital stock by Joseph Solomon and L. Gross. A plant for general manufacturing is to be equipped.

The Weaver Mfg. Company, Springfield, Ill., has been permitted to increase its capital stock from $15,000 to $25,000 for the purpose of extending its factory equipment.

The Antrim Lumber Company, with $500,000 capital stock, organized under the laws of Missouri, has taken over the plants of the Antrim-Todd Lumber Company in Louisiana, Missouri and Oklahoma, and will rehabilitate the mills, etc. The stockholders are Charles A. Antrim, Rush H. Todd, A. H. Beardsley, T. C. Mann and G. W. Castlen.

The Richards Brick Company, Edwardsville, Ill., has plans under way for the enlargement of its plant in the early spring and will be in the market for considerable mechanical equipment.

Bridgeport, Ill., has issued and sold $15,000 in bonds for the preliminary portion of the construction and equipment of a municipal water plant.

The Geneva Mfg. Company, Geneva, Ill., with $20,000 capital stock, has been organized by J. N. Wheeler, M. A. Anderson and B. G. Johnson to manufacture miscellaneous wooden utensils. A plant will be equipped.

The Iron Mountain Railroad has let contract for the erection of an ice plant at Argenta, Ark., of a size sufficient to supply ice for its refrigerator cars operating in that territory. An expenditure of from $90,000 to $100,000 is contemplated.

Texas

AUSTIN, TEXAS, February 3, 1912.

Trade conditions in all lines continue to be very satisfactory throughout the State. Planting of corn and other standard crops will commence in the Southern portions. An unusually large winter vegetable crop is now being moved to market from the lower Rio Grande valley and Gulf coast regions and is bringing to the producers handsome returns. This has stimulated business of all kinds in south Texas and the machinery trade is feeling the beneficial effect along with other lines.

Weaver & Son will increase the capacity of their shipyard at Orange. Additional machinery equipment will be installed.

Morris & Co., Chicago, have under consideration the erection of a large meat packing plant at San Antonio.

H. H. Butz and J. M. Odom have purchased the franchise for the electric light plant at Ft. Stockton from Schraff & Zarbock. The new owners will complete the installation of the plant and will install an ice factory.

The G. E. Green Machinery Company, Plainview, will install 10 irrigation pumping plants upon the lands of E. M. Perry near that place. Each pump will have a capacity of approximately 1500 gal. per minute.

The Wichita Falls Motor Company is preparing to make extensive additions to its plant at Wichita Falls. It is now manufacturing motor trucks at the rate of five per day. When the capacity is increased the output will be more than doubled, it is stated.

Preparations are being made to install a waterworks plant and distributing system at Winters. An estimate of the cost of the improvement is being made by the Clingman-Hall Machinery Company, of Plainview.

Preliminary steps have been taken to organize an irrigation district in the valley of the Nueces River, beginning at a point seven miles above Cotulla, where a large dam will be constructed across that stream. Estimates have been made showing that the proposed works will cost nearly $2,000,000. More than 50,000 acres of land will be reclaimed. Bonds will be issued upon the land to provide necessary money for carrying out the plans.

The Armour Company has let the contract to Thomas Veitch for the construction of a cold storage plant at Stamford, in connection with its new power house which is now being erected.

A. J. Howeth is installing an electric light plant at Oakwood.

The new brick plant of the Seco Pressed Brick Company at D'Hanis has just been finished and is now in operation. The plant has a daily capacity of 90,000 bricks.

The Medina Irrigation Company, San Antonio, has let the contract to the Hess Flume Company, Denver, Col., for $80,000 worth of pressed steel flume material 9 ft. in diameter and 13,100 ft. in length. These flumes will be constructed across a number of deep gulches on the lines of the company's main canal and laterals in the valley of the Medina River near San Antonio.

The Citizens' Light & Power Company, Wichita Falls, has been formed here with a capital stock of $21,000. The incorporators are T. E. Dobson, I. W. Gullahorn and Sam Levi.

The Last Chance Oil Company has been formed at Beaumont, Texas, with a capital stock of $25,000. The

incorporators are J. B. Daniels, N. T. Creary and C. C. Berry.

The Briggs Wesver Machinery Company, Dallas, has increased its capital stock to $300,000 from $150,000.

The Welderport Channel & Dock Company has been formed at Welderport with a capital stock of $10,000. The incorporators are J. J. Welder, J. J. Welder, Jr., and R. H. Welder.

The Prison Commission of Austin will receive bids for furnishing woodworking machinery February 27. Specifications can be had from J. A. Palmer, Huntsville.

The Little Giant Stove & Novelty Mfg. Company, Ft. Worth, with $40,000 capital stock, has been incorporated to manufacture stoves, etc. The incorporators are Lewis Alverson, J. H. Green and G. H. Colvin.

The Standard Mechanical Equipment Company, Houston, with $20,000 capital stock, has been organized by W. H. Earl, W. A. Dilzell and D. H. Murphy.

M. Swenson & Sons, New York bankers, have bought 10,000 acres of land near Velasco and are preparing to equip it with mining machinery, etc., for the purpose of developing its sulphur deposits.

The Marshall Fertilizer Factory, Marshall, Texas, with $15,000 capital, has been organized by John Copeland, A. W. Graff and C. H. Boyd to equip a fertilizer plant.

The two electric light plants and street railway line at Tampico, Mexico, have been merged into one ownership. It is stated that an entirely new power plant will be installed and that the Tampico Electric Company will convert the street car line into electric traction and extend it to La Barra and to a number of other nearby towns.

The Pachuca Light, Power & Railway Company, Pachuca, is preparing to construct an irrigation system that will afford a water supply for more than 50,000 acres of land in the territory around Tula, Actopan and Ixmiquilpan, State of Hidalgo. The company has adopted plans for the construction of a dam that will form a reservoir of a capacity of 75,000,000 cu. m. of water. The main canal will be about 62 miles long.

The Empire Mining Company, Cananea, State of Sonora, Mexico, will install a mill at its property, 24 miles southwest of that place.

The Taxco Mines Company, Taxco, State of Guerrera, Mexico, will construct an aerial tramway at its mines.

The Avino Mines, Ltd., with principal offices in London, England, contemplates installing a smelter at its mines at Avino, State of Durango, Mexico.

The Pacific Coast

SAN FRANCISCO, CAL., January 30, 1912.

Developments in the machine tool trade have thus far been of an encouraging nature, though actual sales are not individually important. Many shops which took preliminary figures six months or more ago are now coming out for a part of their requirements, with prospects of additional business during the summer. The outlook for railroad buying is becoming a little more definite, the Northwestern Pacific having given out a list this week consisting of a motor-driven engine lathe, a mortising machine, bolt-cutter, pipe machine and drive-wheel lathe. Several other railroad lists are expected before the end of February. Old tools are changing hands with increasing frequency, being purchased by many who have taken figures on new equipment. Second-hand equipment of all kinds appears to be plentiful. Dealers in heavy contractors' machinery look for little business in southern California for some time, owing to the marketing of the Los Angeles aqueduct construction equipment.

The demand for contractors' machinery in northern California, however, has increased materially, and an active season is expected in road building equipment. Plans are under way also for the installation of several large rock crushing outfits, and work will probably be started soon on a new cement plant. Woodworking and mill equipment are fairly active. Local mills are awaiting further improvement in building operations, but many small purchases are being made by outside concerns and figures are being taken on a few logging outfits. The principal recent transaction in electrical machinery is the order for the San Francisquito power plant for Los Angeles, the generator contract going to the Westinghouse Company and the water wheels to the Union Iron Works, San Francisco.

Fred Linderman, this city, has placed an order with the United Engineering Works for a 240-ft. steel lumber schooner with a 900-hp. triple expansion engine and two Scotch boilers.

Gladding, McBean & Co., pottery manufacturers, Lincoln, Cal., have purchased through the local agent of the Power & Mining Machinery Company a locomotive and several cars, a No. 3 McCully crusher and belt conveyors.

The Pacific Lumber Company will shortly install a large electric crane in its mill near Eureka, Cal.

H. E. and Wm. Bates and A. C. Hardy have made arrangements to start a machine shop and oil well supply house at Fillmore, Cal.

The city of Los Angeles took bids January 26 for a lot of pneumatic drilling equipment.

The Peerless Brick & Artificial Stone Company. is planning to install a plant at Los Angeles.

The Regan Oil Tool Company has been incorporated at Sherman, Cal., with a capital stock of $25,000 by M. J. Godfrey, J. J., J. M. and E. M. Regan.

The Pacific Tank Company, operating a large woodworking plant in this city, is preparing to move to a new location and is expected to install considerable new equipment.

The Western Pipe & Steel Company, Richmond, Cal., is preparing to make a large addition to its plant, but is believed to have most of the equipment already on hand. The company recently purchased a large compressor.

Del Norte County, Cal., will receive bids March 9 for a 12-ton steam roller and a portable rock crushing plant.

The Southern California Hardwood Mfg. Company, Los Angeles, is working on a large addition to its plant.

A Lidgerwood coaling outfit is to be installed shortly on the naval collier Jupiter at Mare Island navy yard.

The United Engineering Works is installing a complete fire protection system at its plant, Alameda, Cal.

The Gruver Arms & Tool Company, Bakersfield, Cal., has been incorporated with a capital stock of $150,000 by G. W. Gruver, E. D. Burge, C. F. Haberkern, L. McCutcheon and others. The company plans to install a shop at Bakersfield.

The Hurrle Window Glass Company, Stockton, Cal., has been incorporated with a capital stock of $400,000, with the object of installing a factory at Sunnyvale, Cal.

The town of Woodland, Cal., will take figures shortly on a water works pumping outfit.

Figures will be taken shortly on a power plant for the Nevada Valley Power Company, Reno, Nev.

The town of Sonora, Cal., is figuring on the purchase of a steam roller.

Western Canada

WINNIPEG, MAN., February 1, 1912.

Weather conditions have improved and preparations are already being made for spring industrial operations. There is a general complaint of congested transportation facilities and heavy freight for the coming season is moving slowly. There is no great activity yet in builders' supplies, but plans and preparations indicate briskness in the early spring and summer.

The Canadian Pacific, Canadian Northern and Grand Trunk Pacific railroads are making preparations or extending their terminal facilities at Winnipeg and extensive improvements are contemplated in round houses, machine shops, bridges, etc. It is estimated that the three railroads will spend about $60,000,000 in the western provinces this year. Many new branches are on the programmes and there will be great activity at new divisional points.

The Grand Trunk Pacific Railway Company has decided to enlarge its grain elevators at Ft. William at a cost of about $500,000. It is said that altogether 116 bins will be erected, giving an extra capacity of 2,532,000 bushels.

It is announced that the Canadian Consolidated Rubber Company, Ltd., of Montreal, will erect a large factory in Winnipeg. A site covering four acres has been purchased for the purpose.

It is reported that the Canadian Fairbanks Morse Company, Ltd., will erect a manufacturing plant in Winnipeg, for which a site of three acres has been bought recently.

The Anthes Foundry Company, Ltd., Toronto, is preparing to build a factory in Winnipeg for the manufacture of soil pipe and fittings. Tenders have been called for the work of construction. The molding shop alone will be 130 x 300 ft.

An eight-story office and store building is to be erected this coming season in Saskatoon, Sask., for R. M. Gillespie, of St. Louis, Mo. It is said that plans are already being submitted to contractors.

J. Dix Fraser, manager of The Atikokan Iron Works, Port Arthur, acting for MacKenzie & Mann and

an English syndicate, has submitted to the Council of Port Arthur a proposition for the establishment there of a large steel plant.

The T. Eaton Company, Ltd., operating department stores in Toronto and Winnipeg, will proceed at once to build an addition to its Winnipeg store that will supplement its present floor space by about two acres. There will be installed five new passenger elevators and several freight elevators.

An option has been secured on a site in Elmwood, a suburb of Winnipeg, on which a six or seven-story hotel will be erected. E. Cloutier is interested in the project with Eastern capitalists.

The Saskatoon Foundry & Machine Company, Saskatoon, Sask., has been sold to the Western Foundry & Machine Company, Ltd.

The Pacific Door Mfg. Company, Ltd., 744 Hastings street, Vancouver, B. C., has incorporated with a capital stock of $18.000.

The O. K. Lumber Company, Ltd., Kelowna, B. C., has incorporated with a capital stock of $100,000 to carry on business as saw mill proprietor and lumber merchant.

Tenders will soon be called for by the city of Edmonton, Alberta, for a 2000-kw turbo-generator and a 700-kw. rotary converter or motor-generator system. A. J. Latornell is city engineer.

Plans are being prepared for remodeling the biscuit factory of Popham Bros., Ltd., Victoria, B. C.

A site has been purchased at Bassano, Alberta, for a cold storage plant for the Calgary Brewing & Malting Company, Calgary, Alberta. The plant will be built in the spring.

A by-law is to be submitted at Kamloops, B. C., providing for an extension of the water works there.

The water works of Medicine Hat, Alberta, is to be extended at a cost of about $45,000.

The city of Winnipeg, Man., will receive bids until March 1 for furnishing a motor-driven turbine pump of 5,000,000 gal. capacity.

Baltimore Industrial Notes

The Chesapeake Iron Works notes rather quiet conditions. Inquiries for structural work have been confined to small buildings. Among contracts taken is one for a building for Richmond College, Richmond, Va., which will require 120 tons. The contract for the fabricated material for the new machine shop for the Ellicott Machine Company has also been booked. Little real improvement in the structural building situation is expected until more favorable weather conditions prevail.

Rumors are current that the Pennsylvania Railroad Company is again considering plans for a relief line to reduce the pressure of the traffic on its tunnel system. A local committee has been in conference with officials of the company, but no definite action has been taken. Proposed plans involve further extensive tunnel construction, costing several million dollars.

Wallace Stebbins & Sons report January as a comparatively good month. Orders have been numerous and include a 150-hp. boiler for the Excelsior Brick Company, and two 150-hp. Fitzgibbons boilers for a local canning company. Several good boiler installations are being figured on and the outlook for future business is encouraging. The demand for machinists' and mill supplies has been good, and the machine shop department has been busy on general repair work.

Coggins & Owens, who, in addition to the merchant machine tool business, do a large trade in bicycles and sundries, report 1911 as the best year in their history, particularly in the machine tool department. While business the past month was not as active as that in January last year, a very satisfactory volume of moderate orders has been taken.

Plans are being prepared for a new car barn to be erected for the United Railways Company on Hartford road, in the suburban district. The building is to be of brick, stone and reinforced concrete, a large part of the structure being two stories. The estimated cost of the barn and equipment will be in the neighborhood of $100,000.

Plans are being prepared by engineers, it is stated, for a new mill building for the Consolidated Cotton Duck Company, to be erected at Woodberry. The building will measure approximately 75 x 200 ft. and be two stories. Estimates will be asked in the near future.

The recent action by the Maryland Public Service Commission, authorizing an issue of $10,000,000 worth of notes by the Western Maryland Railway Company, will enable that company to go ahead on its proposed policy of expansion and increase of efficiency on its lines. About $3,500,000 is expected to be expended for new equipment. Improvements will be made at Cumberland, Hagerstown and Baltimore, but particulars are lacking at this time.

Priority of the Discovery of Surface Combustion

In *The Iron Age* of December 7, 1911, was reviewed at some length a paper by Prof. William A. Bone, Leeds, England, describing what the author emphasized as the discovery of flameless surface combustion. The discovery, it was explained, covered a method of injecting into a bed of incandescent granular refractory material an explosive mixture of gas and air with resultant perfect combustion. It was applied practically, for example, by forcing the mixture into boiler tubes filled with the granular material, which is brought to a state of incandescence. It would appear that widespread acceptance of Prof. Bone's work as new is difficult to support, judging from an editorial in the Journal of Industrial and Engineering Chemistry for February.

Burning explosive gaseous mixtures in the manner described was accomplished by Dr. Charles E. Lucke, of Columbia University, in 1900, or about 11 years ago. The results of the investigation were given in papers before the engineering public and patents were granted to Prof. Lucke in 1904 on applications filed in 1901. One structure developed by Prof. Bone, however, does not seem to have been employed by Prof. Lucke, and this is the use of the porous diaphragm or slab of refractory material through which the mixture of air and gas is forced, incandescent and flameless combustion taking place at the outside face. The evidence seems clear that Prof. Bone, in emphasizing that he had made a discovery, was not familiar with the American activity in the same direction.

Machine Tool Builders' Tariff Conference

Eastern members of the National Machine Tool Builders' Association held a conference at the Hotel Astor, New York, February 5, to discuss and determine the arguments which they will present to the Finance Committee of the Senate against the placing of machine tools in the free list, as provided in the proposed Underwood metal tariff schedule. This schedule, which has passed the House of Representatives, is now under consideration by the Senate and hearings are to be held by the Finance Committee. The members of the association are of the opinion that when the justice of their cause is made clear the impending menace to American machine tool building in giving free entry to foreign-made machines will be removed. At the conclusion of the meeting it was decided to give no statement to the public at that time. About 30 members of the association were present.

The General Fireproofing Company

The General Fireproofing Company, Youngstown, Ohio, at its recent annual meeting, decided to erect another building at once. It is to be an addition to the steel furniture department and will be four stories. It is just a year since a large addition to the same department was completed.

W. H. Foster, who was elected president, has been vice-president and general manager. In his new position he will continue to be the active head of the plant. M. I. Arms resigned the presidency as he wished to be relieved of active care and responsibility, and becomes chairman of the board of directors. The other officers elected are: A. P. White, vice-president; John T. Harrington, vice-president; F. K. Rhines, treasurer; R. M. Bell, secretary.

The Midvale Steel Company, Philadelphia, Pa., has elected the following directors: Charles J. Harrah, James F. Sullivan, Axel Petre, Charles B. Dunn, Howard Sellers. The officers elected are as follows: President, Charles J. Harrah; vice-president, James F. Sullivan; secretary, H. M. Deemer; treasurer, John C. Dessalot.

New Tools and Appliances

This is essentially a news department for which information is invited.

Single-Spindle Cylinder Boring Machine.—For boring single or twin cylinders the Moline Tool Company, Moline, Ill., has brought out a new single-spindle machine which, if desired, can be equipped with a compound table so that two or more cylinders can be bored at the one setting. This table is equipped with a screw traverse, adjustable stops and clamping screws so that it can be quickly set to any desired position. The drive is direct from the cone pulley to a hardened steel pinion which meshes with a phosphor bronze spiral gear. Six speed changes are available through the use of a double-speed counter shaft. The feed is by double steel rack and pinions, the former being set under the center of the table so that all side strain is eliminated. The feed pinions are cut integral with the feed shaft, which is driven by bronze spiral gearing and a worm reduction gear. The table is counterbalanced and has an automatic stop and a quick return by the pilot wheel. The knee extends about equally above and below the surface of the work table and travels on square guides, provision having been made for taking up wear in both directions. The extended face of the knee above the table has a T-slot so that jigs can be bolted to the back of the knee as well as to the top of the table. The spindle, which is hollow, has a diameter of 3 11-16 in. and is bored for a No. 6 Morse taper. It has a slotted end for the driver as well as a draw-in and knock-out rod. Ball bearings are used to take the thrust.

Surface Grinder.—A surface grinder in which the grinding wheel operates in both directions has been recently brought out by the J. A. Stowell Company, Leominster, Mass. The crucible steel spindles are turned and ground and have self-oiling bearings. The table has power for both longitudinal and traverse motions. The travel is automatic, and by throwing in a clutch, which operates at each end of the stroke, power feed can be secured. The table is elevated by hand, the screw being fitted with a dial graduated in thousandths of an inch. The capacity of the machine is work 36 in. long and 10½ in. wide and 12 in. high. The table has a travel of 16 ft. per minute and the counter shaft speed is 315 r. p. m.

Shockless Jarring Machine.—What is said to be the largest shockless jar-ramming molding machine ever built was recently completed by the Tabor Mfg. Company, Philadelphia, Pa. The steel table, with which the machine is equipped, measures 8 x 12 ft., and the cylinder has a diameter of 36 in. This is mounted on a cast-iron plunger base weighing about 65,000 lb., and the whole is fitted in a 5-ft. cylinder base and rests upon 22 helical steel springs. The stroke can be varied from 1 to 4 in., and this adjustment can be made while the machine is running. The particular field for which this machine is designed is the ramming up of molds from 6 to 8 ft. wide and 12 to 18 ft. long, the capacity of the machine being 50,000 lb. The total weight of the machine is between 90,000 and 100,000 lb.

Adjustable Tool Holder.—A tool holder in which it is possible to shift the position of the cutter in relation to the work has been recently added to its line by the Krieger Tool & Mfg. Company, 564 West Randolph street, Chicago, Ill. These changes are effected by a tapered block, which is placed above the tool when the cutter is to be set in an angular or inclined position and to be lowered when it is to be set level. In the former position the tool is tilted slightly sideways, thus giving the top of the cutter the side slope for turning iron or steel, while when it is set level brass can be threaded or turned.

Universal Grinder.—A universal grinder designed to do all kinds of internal and external grinding work up to 7 in. in diameter and 18 in. long and especially adaptable to the grinding of cutters, reamers, end mills, drills, saws and other tool room work of a varied nature where a high degree of accuracy is required has been recently brought out by Hardinge Bros., 3133 Lincoln avenue, Chicago, Ill. The base of this machine has mounted upon it a swiveling bed to facilitate taper grinding. This table is designed to carry the maker's dustproof bench lathe head, which can be used interchangeably, an arrangement that greatly increases the range of the machine, since it makes possible the use of various attachments. The angular position of the bed is shown by a steel plate inserted in the base on the left side. This plate is graduated to 10 deg. on each side of a central zero line, and as the graduations are on a 36-in. circle accurate readings can be taken. The angular position of the bed is easily changed by unlocking two hand nuts. The wheel spindle is mounted on a slide and is not directly operated by a cross feed screw but is carried by a lower slide. These two parts are secured by knurled screws, and it is possible to move the grinding wheel toward and away from the work rapidly. A handle with a micrometer dial provides for fine adjustment of the wheel. The base carrying the grinding spindle can be set at any angle.

Automatic Chucking and Turning Machines.—A new automatic chucking and turning machine has been brought out by the Potter & Johnson Machine Company, Pawtucket, R. I. In general this machine follows the other ones of this company in its construction, but its capacity and power are greater. Its special field is the manufacture of motor truck parts such as chain sprockets, brake drums, hubs, pistons, cylinders, fly wheels and similar work in this and other lines. The cutting operations are all performed automatically, so that one workman can operate from two to six machines, according to the nature of the work. The head stock can be adjusted along the bed within certain limits to suit the length of the work being handled. All speed changes are obtained through gearing inclosed in the base and the spindle has four automatic and five hand speed changes, the latter being obtained through change gears. In this way twenty spindle speeds varying in geometrical progression from 5½ to 163 r. p. m. are available. The spindle is driven by a gear attached to the chuck or face plate and the speed clutches are powerful frictions. Four automatic feed changes, including a threading and reaming feed and six hand changes, are available. All the automatic changes of speed and feed are actuated by revolving cams, and as the changes are effected instantaneously, they can be made at any part of the cutting stroke. The cross slide, which is adjustable longitudinally along the bed, has front and rear tool blocks, each of which carry two tool posts. The turret, which has four stations where tools may be mounted, is advanced, returned and revolved automatically, and as these movements are performed at a high constant speed, little time is lost in changing from one operation to another. When the turret slide has advanced to the point where the tools begin cutting a slower feeding motion is automatically engaged. A 21-in. three-jaw scroll chuck is included in the equipment of the machine, and this is provided with a pilot bushing to receive pilot bars for supporting the tools. The drive is of the single pulley type, which makes the application of a motor easy. When this drive is to be used the motor bracket is bolted to the base and the drive is through a pinion and gear, which are substituted for the regular driving pulley.

Tool Driving Tang.—Elmer S. Gross, Harrisburg, Pa., has brought out a new type of tang drive for tools having Morse taper shanks. The socket employed with this style of tang has the ordinary cross slot with clearance for a drift key and also shorter cross slots offset to correspond to the side tangs. The advantage of employing offset side tangs is the securing of a more rigid construction.

Helve Hammer.—The West Tire Setter Company, Rochester, N. Y., has recently brought out a manufacturer's type of helve hammer in three sizes designated as the 60, 80 and 100-lb styles. The frame is a solid casting with large-dimension shaft boxes lined with babbitt metal. Wood segments separate the anvil from the frame and absorb the shocks from the blows and prevent them from being transmitted to the frame. The top part of the anvil can be removed or adjusted if necessary, since it is made in two parts, which are keyed together. The bearings supporting the helve have an adjustment of 5 in., which is controlled by screws. As the connecting rod can be adjusted also, this adjustment of the helve enables the hammer to be adapted to a wide range of work. The tendency to crystalization is minimized, it is claimed, by the use of hickory for the helve and U-shaped springs and connecting toggles, which are so designed that a cushion is obtained by a slight action of the spring.

Trade Publications

Grab Buckets.—Whiting Foundry Equipment Company, Harvey, Ill. Folder. Deals with a single-line grab bucket having a capacity of 2 cu. yd. Views showing the bucket opened and closed are given. One of the special features claimed for this bucket is that it will dig the same as a two-line bucket and has unloaded 40 tons of sand from cars in 20 min.

Lamps.—Cooper Hewitt Electric Company, Eighth and Grand streets, Hoboken, N. J. Instruction sheet No. 37,001. Contains instructions for the installation and operation of automatic quartz lamps for direct-current circuits. These lamps are made in two types for voltages of 110 and 220 respectively. The mounting and the wiring of the lamps is discussed and this is followed by directions for unpacking and mounting the burner and the operation and regulation of the lamp. The various causes of trouble met with in the operation of these lamps are discussed and this is followed by a brief statement of how to remedy them.

Fuel Economizer.—Green Fuel Economizer Company, Matteawan, N. Y. Bulletin No. 140. Contains reprints of five articles appearing in technical journals describing power plants in which this company's fuel economizers have been installed, together with notes on economizer practice.

Boring Mills.—Gisholt Machine Company, Madison, Wis. Circular. Deals with installations of this company's boring mill which have been made in Europe and gives half-tone reproductions of four of them.

Carriage and Wagon Forgings.—Richard Eccles Company, Auburn, N. Y. Catalogue No. 16. Size 6 x 9 in.; pages, 95. Deals with a line of carriage and wagon makers' forge irons of various types. All of these are illustrated with brief tables giving the sizes and the dimensions and prices. A complete alphabetical index of the different forgings is included.

Cranes.—Reading Crane & Hoist Works, Reading, Pa. Two circulars. One describes the various types of single and double I beam cranes which this company builds for quick delivery while the other illustrates a line of overhead track trolleys, switches and turntables.

Washers.—Edwin B. Stimpson Company, 68 Franklin avenue, Brooklyn, N. Y. Mailing card. Deals with a line of washers of every description for various purposes made from a variety of metals. Some idea of the diversity of this line can be secured from the illustrations of the different types on the back of the card.

Steam Turbines.—De Laval Steam Turbine Company. Trenton, N. J. Pamphlet entitled "A Steam Turbine for Driving Direct-Current Generators." Presents an extended discussion of the various types of steam turbines and their comparative merits. The topics of steam and bucket velocity and various methods of steam reduction by velocity and pressure stages either separately or in combination and by gears and the various other matters connected with the compromise which must necessarily be effected between the speed of the steam and the maximum speed of the driven units are taken up. The booklet also shows how the use of a number of stages instead of one stage permits large capacity turbines to be built with moderate diameters, since with the lower speed longer vanes or buckets can be used in the low-pressure stages. A multistage geared turbine which can be applied to driving direct-current generators and the direct driving of centrifugal pumps, blowers and air compressors is also described.

Calendar.—Mussens, Ltd., dealer in machinery and supplies for railroads, mines, contractors, mills, factories, machine shops, etc., with headquarters at Montreal, Canada, and branches in Toronto, Cobalt, Winnipeg, Calgary and Vancouver, has issued a wall calendar of exceptionally large size. The leaves measure 21 x 33 in., the calendar occupying about two-thirds of this space while the remaining upper third is devoted to illustrations of various lines handled by this firm.

Calendar.—Flat-Top Fuel Company. Bluefield. W. Va. Calendar hanger, measuring 25 in. square. The leaves containing the dates for each month are printed with large figures on a contrasting background and are clearly set off by rules.

Calendar.—T. W. Leavitt & Co., 30 Church street. New York City, importers and selling agents of ores, metals and alloys, have issued their annual calendar. In addition to being headquarters for antimony, magnesium metals and ferroalloys, the firm is also agent for the Girod electric furnace and an illustration of the 15-ton size is given on the hanger.

Air Compressors.—George E. Dow Pumping Engine Company, San Francisco, Cal. Catalogue. Describes and illustrates a line of air compressors which are made in various types for different classes of service. In general an illustration of the compressor is given on the left-hand page while a brief description and table of specifications occupy the facing page. A general de scription of the structural details and several tables of useful information are included.

Metal-Working Machinery.—Garvin Machine Company, Spring and Varick streets, New York City. Several circulars. Nos. 139, 164, 167 and 170 describe various types of the company's vertical and plain milling machines. Among these are the No. 2-A and the No. 22 plain machines illustrated descriptions of which appeared in *The Iron Age*, December 15, 1910, and July 13, 1911, respectively. Circular No. 165 is concerned with the No. 2 rapid screw slotting machine which has been built to supply a simple and convenient tool. Circular No. 168 is concerned with a line of cutter and surface grinders, two of which were illustrated in *The Iron Age*, August 3, 1911.

Signals.—International Automatic Signal Company, Twelfth and Washington streets, Kansas City, Mo. Pamphlet. Illustrates the Carson-Burgess electro-automatic signal system which was designed for use on either steam or electric railroads. The signal is of the cab type with automatic stop and employs both audible and visible signals. It operates on a closed circuit and is self-indicating, a danger signal being shown if the system is out of order. It is pointed out that the equipment of the system is of standard goods that can be bought in open market and the various appliances are easily installed on the right-of-way and the rolling stock.

Nuts and Bolts.—Columbus Bolt Works, Columbus, Ohio. Loose leaf sheets. Show the various changes that have been made in the company's line of goods since the last catalogue was issued in 1908. This catalogue was of the loose-leaf type and the pages are perforated so that they can be readily inserted to replace the old ones which have become obsolete.

Calendar.—McClintic-Marshall Construction Company, Pittsburgh, Pa. Calendar hanger measuring 10¾ x 13½ in. The leaves of this calendar are printed in heavy black figures on a white background and the calendar for the previous and the following month is given. One of the special features is the numbering of the days so as to indicate how much of the year has elapsed. The upper portion of each leaf is embellished with a half-tone engraving of some bridge or structural contract for which this company furnished the steel. A complete calendar for the year 1912 is given on the hanger.

Continuous Reading Caliper.—Blanchard Machine Company, Cambridge, Mass. Circular. Points out the advantages of using the new Blanchard continuous reading caliper or excess stock indicator in connection with the company's high power vertical surface grinder, which was illustrated in *The Iron Age*, October 13, 1910. This caliper has a dial graduated in thousandths of an inch and a pointer to indicate the excess stock which has to be removed to get the piece to its proper size. As the grinding continues the pointer indicates successively the amount of stock remaining until the proper size has been reached.

Heating and Ventilating.—B. F. Sturtevant Company, Hyde Park, Mass. Mailing card. Devoted to the Sturtevant system of heating and ventilating in which the apparatus is centralized and there is no steam piping scattered around the building. The various advantages of the system, such as rapid heating, ample and positive ventilation, cooling the building in summer and the use of fireproof material, as far as possible, are briefly touched upon.

Pile Hammers.—McKiernan-Terry Drill Company, 115 Broadway, New York. Pamphlet. Calls attention to a line of pile hammers that are operated with either steam or compressed air. These hammers are made in two sizes, namely 2¼ and 3¼ in. Brief specifications, together with exterior and sectional views of both hammers are given. A number of engravings showing the hammers in use are also included.

Emery Wheel Dressers.—Collmer Bros., South Bend, Ind. Folder. Treats of two types of emery wheel dresser made by this firm. Various other products, such as pipe cutters and wheels, automobile engine sprocket wheels and lathe dogs, are also shown.

Lathes.—The Milwaukee Machine Tool Company, Milwaukee, Wis. Loose leaf circulars. Deal with description and specifications for a line of lathe which includes tools having swings of 16, 20 and 24 in. A separate page is devoted to each of these tools, an illustration being given at the top, followed by a brief description and a condensed table of specifications.

Electric Motors.—The Emerson Electric Mfg. Company, St. Louis, Mo. Three bulletins. No. 3144, replacing No. 3141, illustrates and describes a line of single-phase induction motors of the full load start condensed clutch type, which are built in sizes ranging from 1-10 to 1-5 hp. These motors are capable of starting under loads considerably in excess of their ratings and of operating under full load within the requirements of ordinary service without undue heating, although they are not designed for continuous full load operation for long periods. No. 3220, replacing No. 3215, treats of a line of direct-current ventilated motors ranging in capacity from ½ to 1 hp. The construction of these motors, which are designed for general service, is described at length and in common with the preceding bulletin; connection diagrams and brief specifications are included. Bulletin No. 3710, replacing No. 3708, relates to a line of laboratory lathes, designed for operation on either alternating or direct current circuits. Half-tone engravings showing the various types of chucks which can be furnished with these motors are included.

Calendar.—The Goldschmidt-Thermit Company, 90 West street, New York City. Calendar hanger measuring 21x28 in. Like the calendar issued last year, this one is embellished with a map of the world and engravings showing various repairs made by the Thermit process. The repairs illustrated include a crank shaft weld, a repair to the stem frame of a steamship and three views illustrating the process of rail welding.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

Burden of Proof in Personal Injury Actions.—One suing for the death of an employee must show that the latter's own negligence did not contribute to the accident. (Maine Supreme Judicial Court, Fournier vs. York Mfg. Company, 81 Atlantic Reporter 82.)

Liability for Injury to Invitees Upon Premises.—One must use reasonable care to make premises owned or occupied by him reasonably safe to avoid injury to persons expressly or impliedly invited by him to come upon the premises, considering the reasonable care which the invitee must use for his own safety, and the scope of the invitation. (Illinois Supreme Court, Devaney vs. Otis Elevator Company, 95 Northeastern Reporter 990.)

Liability for Injury to Foundry Employee.—A foundry employee injured by being caught by the projection through an opening in a revolving rumbler of a casting which was being polished cannot recover on the theory that the opening was negligently permitted to exist and was caused by a gradual wearing away of the staves of the rumbler by sand passing through, where such theory is based largely on conjecture and it is more probable that the opening was caused by the breaking of a stave of which the employer was without notice. (Pennsylvania Supreme Court, Conway vs. Philadelphia Hardware & Malleable Iron Works, 81 Atlantic Reporter 421.)

Liability for Injury to Foreign Employee.—A manufacturer is liable for injury to a foreign employee of less than ordinary intelligence, caused by caving of the walls of a pit in which he was directed to work, due to the pressure of a pile of iron bars nearby and the sandy nature of the soil. (Indiana Supreme Court, Standard Forging Company vs. Saffel, 96 Northeastern Reporter 321.)

Rights and Liabilities Under Contract for Sale of Pig Iron.—A manufacturer, on being prevented from filling his contracts, on account of insufficient transportation facilities, must pro rate shipments among his customers, and has the burden of showing that a complaining buyer has received his fair quota. The measure of damages recoverable for breach of contract to buy pig iron is the difference between the contract price and the higher market price at the time of the breach. (United States District Court, Northern District of Ohio, in re Bellevue Pipe & Foundry Company, 189 Federal Reporter 169.)

Rights Under Warranty of Efficiency of Pumps.—A manufacturer can recover the reasonable value of labor and material furnished in making air pumps, no fixed price being agreed upon, if their failure to make a warranted pressure is due to defects in the buyer's system to which the pumps are attached. If the inefficiency is due to the manufacturer's fault he can recover such amount only as the pumps are worth to the buyer. (Delaware Superior Court, Modern Machinery Company vs. Perkins, 80 Atlantic Reporter 1060.)

Right to Revoke Order for Delivery to Third Party.—An order to a railroad company to deliver iron ore to a furnace company, as a mere accommodation by the owner, without valuable consideration, was revocable any time before the furnace company took possession. (Pennsylvania Supreme Court, Staake vs. Pennsylvania Railroad Company, 80 Atlantic Reporter 1102.)

Right to Discharge Employee Under Contract.—If a contract of employment reserves to the employer the right to discharge on the service becoming unsatisfactory, he may exercise such right, if he acts in good faith, though the employee does his work efficiently. The measure of damages recoverable for wrongful discharge is the difference between the compensation contracted for and any lesser amount which the employee has earned, or, in acting with reasonable prudence, could have earned, elsewhere. (Kentucky Court of Appeals, Bridgeford & Co. vs. Meagher, 139 Southwestern Reporter 750.)

Validity of Contract of Sale by Foreign Corporation.—An agreement made in Wisconsin by a corporation organized under the laws of another State to sell machinery manufactured or kept for sale in Wisconsin is void if the corporation has not obtained a license to do business there. (Wisconsin Supreme Court, Wolf Company vs. Kutch, 132 Southwestern Reporter 981.)

Right to Withdraw Order.—A written order for machinery to be shipped at a future date may be withdrawn by the buyer any time before its acceptance by the seller. A letter requesting cancellation of "our order" of a specified date is a sufficient withdrawal of the order. (North Dakota Supreme Court, J. L. Owens Company vs. Bemis, 133 Northwestern Reporter 59.)

Waiver of Seller's Right to Replevy Goods.—A seller of goods waives the right to replevy them for the non-payment of a check given in part payment of the price by delaying such action several weeks after being advised of the check's dishonor. (Wisconsin Supreme Court, L. C. Smith & Brothers Company vs. Luebkeman, 133 Northwestern Reporter 33.)

Scope of Salesman's Authority.—A salesman has no implied authority to rescind or modify the contract for a consummated sale, nor to agree to receive the goods back in compromise of the buyer's debt. (Arkansas Supreme Court, American Sales Book Company vs. Whitaker, 140 Southwestern Reporter 132.)

Right of Buyer to Reject Articles on Substitution of Brand.—A buyer of articles of a specified brand is entitled to reject delivery of articles of another brand, though they be of better quality than those contracted for. (Texas Court of Civil Appeals, Markham Warehouse & Elevator Company vs. Plotner & Stoddard, 140 Southwestern Reporter 356.)

Waiver of Seller's Right Under Warranty.—A seller of machinery waives the buyer's contract duty to return defective parts to be replaced by repudiating liability under a warranty as to the machinery's efficiency. (Kansas City Court of Appeals, J. I. Case Threshing Machine Company vs. Gardner, 140 Southwestern Reporter 318.)

Validity of Wire Fence Patent.—A patent for a die for forming a wire knot in wire fencing and one for the knot formed by such a die, but which may be formed by hand or by any suitable shaping mechanism, are not for the same invention, and the latter is not void or double patenting. (United States Circuit Court, Eastern District of Michigan, Adrian Fence Company vs. Jackson Fence Company, 190 Federal Reporter, 195.)

Right to Restrict the Price of Patented Articles.—A patentee's right to restrict the price at which articles shall be resold extends to one to whom he has granted the exclusive right to manufacture and sell. (United States Circuit Court, Western District of Michigan, Thomas A. Edison, Inc., vs. Ira M. Smith Mercantile Company, 188 Federal Reporter, 925.)

Effect of Contract for Manufacture of Patented Devices.—A contract permitting, but not requiring, a party to manufacture and sell patented machinery, on payment of royalties, is not subject to concellation by the patentee on the manufacturer's refusal to manufacture or attempt to sell machines. A provision requiring the manufacturer to be diligent in supplying the market with sufficient machines to supply the demand does not require effort to create a market or to attempt to sell. (United States Circuit Court, Northern District of Illinois, Dixie Cotton Picker Company vs. Bullock, 188 Federal Reporter, 921.)

Operation of Sherman Anti-Trust Law.—The Sherman anti-trust act does not affect a patentee's right to monopolize for the term of his patent the subject thereof. A manufacturing corporation is engaging in interstate commerce, within the Sherman act, if its products are manufactured in one State and stored in other States for sale there. (United States Circuit Court for Maryland, United States vs. Standard Sanitary Mfg. Company, 191 Federal Reporter, 172.)

Rights Under Contract of Sale.—A seller of goods impliedly warrants that they are of merchantable quality, and, if they are not so, the buyer can rescind the contract by returning or offering to return the goods. Failing to do this, it will be conclusively presumed that they were fit and suitable or at least that he was satisfied with their quality. (Nassau County Court, Tichnor vs. Barley, 132 New York Supplement, 243.)

Act Not Constituting Acceptance of Machinery by Buyer.—That a company which bought machinery mortgaged it to its president to secure a loan does not show an acceptance of the machinery so as to prevent exercise of an option reserved to the company to return the machinery if it failed to work satisfactorily. (New York Court of Appeals, Harrison vs. Scott, 96 Northeastern Reporter, 755.)

Rights of Parties to Sale on Breach of Warranty.—A seller of a gasoline engine cannot escape liability for breach of warranty that it was frostproof by offering to return the purchase price and receive back the engine, though the buyer might either rescind the contract and return the engine, or affirm the contract, retain the engine and sue for breach of warranty. (Kansas City Court of Appeals, Sanders & Adkins vs. John I. Mosbarger & Son, 141 Southwestern Reporter, 720.)

Current Metal Prices.

The following quotations are for small lots. New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly report.

IRON AND STEEL—

Bar Iron from Store—

Refined Iron:	
1 to 1⅝ in. round and square ... 1⅝ to 4 in. x ⅝ to 1 in. ... 1⅛ to 4 in. x ¼ to 5-1	₩ lb 1.70¢
Rods—⅝ and 11-16 round and square.	₩ lb 1.80¢
Angles:	Cts. ₩ lb.
3 in. x ¼ in. and larger	1.80¢
3 in. x 3-16 in. and ⅛ in.	2.20¢
1½ to 2½ in. x ⅛ in.	1.95¢
1½ to 2⅝ in. x 3-16 in. and thicker	1.85¢
1 to 1¼ in. x 3-16 in.	1.95¢
1 to 1¼ x ⅛ in.	2.00¢
⅞ x ⅛ in.	2.10¢
⅞ x ⅛ in.	2.15¢
⅝ in. x ⅛ in.	3.35¢
½ x 3-32 in.	4.40¢
Tees:	
1 in.	2.25¢
1¼ in.	2.10¢
1½ to 2½ x ¼ in.	1.90¢
1½ to 2½ x 3-16 in.	2.00¢
3 in. and larger	1.85¢
Beams	1.80¢
Channels, 3 in. and larger	1.80¢
Bands—1½ to 6 x 6-16 to No. 8	2.00¢
Burden's "H. B. & S." Iron, base price	2.95¢
"Burden's Best" Iron, base price	3.15¢
Norway Bars	3.60¢

Merchant Steel from Store—

	₩ lb.
Bessemer Machinery	1.70¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, Soft Steel.	R G. Cleaned
No. 16	₩ lb 2.40¢	2.95¢
Nos. 18 to 20	₩ lb 2.45¢	3.05¢
Nos. 22 and 24	₩ lb 2.50¢	3.15¢
No. 26	₩ lb 2.55¢	3.25¢
No. 28	₩ lb 2.65¢	3.45¢

Russia, Planished, &c.

Genuine Russia, according to assortment	₩ lb 12 @ 14½
Patent Planished, W. Dewees Wood	₩ lb A. 10¢; B. 9¢ net

Galvanized

Nos. 12 and 14	₩ lb 2.75¢
No. 24	₩ lb 3.10¢
No. 26	₩ lb 3.30¢
No. 28	₩ lb 3.60¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—

Galvanized

Nos. 22 and 24	₩ lb 5.50¢
No. 26	₩ lb 6.00¢
No. 28	₩ lb 7.00¢

Corrugated Roofing—

2½ in. corrugated.	Painted.	Galvd.
No. 24 ₩ 100 sq. ft.	$3.75	$4.70
No. 26 ₩ 100 sq. ft.	2.85	3.90
No. 28 ₩ 100 sq. ft.	2.50	3.65

Tin Plates—

American Charcoal Plates (Per Box)

AAA Charcoal:	
IC, 14 x 20	$6.35
IX, 14 x 20	7.60
A Charcoal:	
IC, 14 x 20	$5.30
IX, 14 x 20	5.40

American Coke Plates—Bessemer—

IC, 14 x 20 ..... 107 lb	$4.20
IX, 14 x 20	5.20

American Terne Plates—

IC, 20 x 28 with an 8 lb coating	$8.10
IX, 20 x 28 with an 8 lb coating	10.10

Seamless Brass Tubes—

List November 13, 1908 ..... Base price, 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908 ..... Base price, 18¢

Copper Tubes—

List November 13, 1908 ..... Base price, 21¢

Brazed Brass Tubes—

List February 1, 1911. 20¾¢ ₩ lb

High Brass Rods—

List February 1, 1911. 15¾¢ ₩ lb

Roll and Sheet Brass—

List February 1, 1911. 16¢ ₩ lb

Brass Wire—

List February 1, 1911. 15¾¢ ₩ lb

Copper Wire—

Base Price, Carload lots mill 15¼¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz. (quantity lots) ₩ lb 19¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

Tinning, one side, 3½¢ ₩ square foot.

METALS—

Tin—

Straits Pig ₩ lb 47¢ @48 ¢

Copper—

Lake Ingot	₩ lb 15¼ @16¼¢
Electrolytic	₩ lb 15¼ @15½¢
Casting	₩ lb 15 @15¼¢

Spelter—

Western ₩ lb 7⅜@ 7¼

Zinc—

No. 9, base, casks.. ₩ lb 8¾¢. Open, ₩ lb 9¼¢

Lead—

American Pig	₩ lb 5½@5¾¢
Bar	₩ lb 7 @7¼¢

Solder—

½ & ½ guaranteed	₩ lb 26¾@27¼¢
No. 1	₩ lb 24½@25 ¢
Refined	₩ lb 23 @23¾¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ lb..@10¼¢
Hallets	@10 ¢
Other Brands	9@ 9½¢

Bismuth—

Per lb ..... $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting (ton lots)	19¼¢
Rods & Wire	Base Price 31¢
Sheets	Base Price 33¢

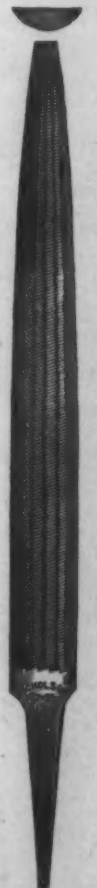
Old Metals—

Dealers' Purchasing Prices Paid in New York.

Copper, heavy and crucible	12.25
Copper, heavy and wire	12.00
Copper, light and bottoms	11.00
Brass, heavy	8.50
Brass, light	6.50
Heavy machine composition	10.50
Clean brass turnings	8.00
Composition turnings	9.00
Lead, heavy	4.00
Lead, tea	3.75
Zinc, scrap	4.75

Nicholson Files

Mean Efficient Workmen



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The temper of your mechanics is affected by the temper of your files.

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